

**FIELD PROCEDURES**  
**FOR THE**  
**SOUTHEAST ALASKA INVENTORY**  
**2000**



**USDA FOREST SERVICE**  
**PNW STATION - FORESTRY SCIENCES LAB**  
**& REGION 10 - ALASKA**



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# **SECTION 1**

## **GENERAL INSTRUCTIONS**

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## **INVENTORY OVERVIEW**

Field procedures for the Southeast Alaska (SEAK) Grid Inventory will be carried out at around 2000 sample locations. Each location consists of four sample points. At the sample points, data will be collected on five types of sample plots:

*Fixed Radius Tree Plots:* 7.3 m. (24 ft.) radius on all four sample points.

*Fixed Radius Seedling/Sapling Plots:* 2 m. radius at all four sample points.

*Horizontal/Vertical Profile Plot:* 5.64 m (18.5 ft.) radius at the first point in each vegetation type.

*Downed Wood Transect:* (11.28 m/37 ft.) Three transects at each HV plot.

*Soil Pit:* at all four sample points.

Information collected on these plots is organized into eight record types: Location, Point, Polygon, Tree, Horizontal/Vertical Vegetation Profile (HV), Downed Wood, and Soils.

The point, polygon, tree, downed wood, and soils will be completed on the Husky FS/2 field computer. The location and HV profile records will be completed on paper forms.

## **ESTABLISHING THE LOCATION**

Establishing the location is the crucial first step in collecting valid field data. Each location to be sampled on the ground was selected from a 4.8 km (3 mile) grid. While measurements at each location are used to collect statistical information for the entire inventory unit, each location is also compared to satellite information for the same point. Because these sampling layers must measure attributes on the same location, it is critical that the ground sample be located as accurately as possible.

Using a map, ortho photos, aerial photos, and the PLGR, the first task is to find the ground location of the initial sampling point (IP) delineated on the photos. All ground locations will be located from a reference point (RP) so that the location can be found during future remeasurements. At some locations, the IP can also be located on the ground visually without chaining from a reference.

### **Locating the field sample location (Using Photos)**

Normally the field crew will establish the sample location using ortho photos. On occasion the ortho photos will not be adequate for establishing the location and a “pocket” CIR photo will be used instead. The procedures for using either medium are similar but the CIRs require additional steps for scaling and orientation. To accurately establish the field location the crew will need to determine:

- 1) Photo Scale to determine distance
- 2) Azimuth to determine direction

## Photo Scale

Ortho Quads: If using the ortho photos, the scale is already available. The ortho photos have been printed at a scale of **1:15840**.

CIR Photos: If there is not enough detail on the ortho photo then the color infrared (CIR) print can be scaled by using information from the ortho photo or measuring objects on the ground.

To obtain **photo scale reciprocal (PSR)** for the CIR photos **using the ortho photo**, do the following:

- a) Locate two points on the aerial CIR photo that can also be located on the ortho photo and pinprick them on the CIR. The two objects should be at least one centimeter apart.
- b) Using a millimeter scale, measure the distance between the points on each of the photos in meters (1mm=.001m).
- c) Use the following formula to obtain the PSR:

$$\text{Photo Scale Reciprocal} = \frac{\text{Ortho Distance}}{\text{CIR Distance}} \times 15840$$

To obtain **PSR** for the CIR photos **using ground objects**, do the following:

- a) Locate two points on the aerial photo (CIR) that can also be located on the ground and pinprick them on the CIR. The two objects should be at least 1/2 centimeter apart on the photo.
- b) With a 30 m. tape, measure the distance between the objects on the ground, and with a millimeter scale, measure the distance between the objects on the CIR. Measure both distances in meters.
- c) Use the following formula to calculate the PSR:

$$\text{Photo Scale Reciprocal} = \frac{\text{Ground distance}}{\text{CIR distance}}$$

## Base Line Azimuth

Ortho Quads: When using supplied ortho photos, the azimuth for a baseline on the photo can be found on the plot location folder. For locations visited in 1996 and later, the baseline azimuth is magnetic, with declination based on current World Aeronautical Charts (CD-12 & CE-15). If the magnetic azimuth of the ortho-photo baseline is in question, note that sample location labels are **always** printed so that when the label is properly oriented, the top of the ortho map is “north.”

CIR Photos: For CIR photos, the base line azimuth, like photo scale, can be obtained by one of two methods: using the ortho photo or measuring between points on the ground.

To obtain an **azimuth** for the CIR photos **using the ortho photo**, do the following:

- a) Visually but accurately transfer the true north baseline from the ortho photo to the CIR photo and then subtract the declination from 360° to get the magnetic azimuth.
- b) Record this azimuth on the photo.

To obtain an **azimuth** for the CIR photos **using ground measurements**, do the following:

- a) Select two points within sight of each other that can also be seen on the CIR. Pinprick these points and draw a line between them.
- b) On the ground, sight between the two objects and record the magnetic azimuth on the CIR photo.

## Calculating Reference Point (RP) to Initial Point (IP) Distance and Azimuth

- a) With the aid of a stereoscope, locate the RP on the CIR and pinprick it on the ortho photo. Describe the RP on the location record sheet and circle it on the back of the ortho photo.
- b) Draw a line between the RP and the IP which also intersects the baseline (described above). If the RP-IP line does not intersect the baseline, then a third line intersecting the baseline at a 90° angle can be drawn and its azimuth determined by placing the center of a photo protractor at the intersection of the new line and the baseline, turning the protractor so that the proper azimuth on the protractor is lined up with the baseline and then reading the new azimuth. The new line now becomes the baseline.
- c) Determine the direction from the RP to the plot by placing the center of the photo protractor at the intersection of the baseline/RP-IP lines. Turn the protractor so that the baseline azimuth on the protractor is lined up with the baseline.

Read the RP-IP azimuth off the protractor and record it on the back of the photo and on the location record sheet.

Measure the photo distance (PD) between the RP and IP using a millimeter scale (record in meters, e.g. 1mm=.001m). Calculate the ground distance using the following formula:

$$\text{Ground distance} = \text{PSR} \times \text{PD}$$

Record the ground distance on the back of the photo and on the location record sheet.

- e) Collect all other necessary information for the reference tree (see below) and tag it.
- f) Using compass and tape, measure out the computed distance, correcting for slope, between the RP and IP. Measure from the face of the RP to the IP.

## **Collecting location coordinates using GPS**

Plots are located primarily using Ortho Photos or other imagery if needed. Using aerial photos and other imagery may not be 100 percent accurate but is considered the best method available and assumed to be unbiased. GPS is used to obtain accurate coordinates for each plot, primarily to facilitate relocating the plot in the future.

This inventory will be using the PLGR military receivers to collect coordinates. PLGR stands for *Precision Lightweight GPS Receiver*. These units will provide coordinates that do not have to be differentially corrected in the office. Thus, the coordinates obtained in the field are as accurate as possible.

The following procedures explain where and how each crew will collect and record GPS coordinates. Refer to the Precision Lightweight GPS Receiver (PLGR) instruction manual for detailed information on using the PLGR.

GPS coordinates must be collected at the LZ, RP, and IP. Additional coordinates may be collected at points 2-4 or at landmarks as needed.

- **Landing Zone (LZ) or Truck** - collect and record coordinates for the LZ or site where the vehicle is parked. These coordinates will provide information to future crews for access and may also help the crew relocate the LZ / vehicle in an emergency.
- **Reference Point** - collect and record coordinates for the reference point, regardless of how near or far from the initial point (IP). If the LZ/Truck and RP are the same location be sure to record the coordinates twice on the data sheet and save the waypoint twice with the proper names.

- **Initial Point** - collect and record coordinates for the initial point (IP).
- **Other Points** - collect and record coordinates for additional points if IP coordinates are not possible. Be sure to note the point number both on the data sheet and in the waypoint name. Also, use the **Range-calc** function to calculate coordinates for the initial point (IP).
- **Landmarks** - collect and record coordinates of landmarks if they are particularly helpful in locating the plot. Landmarks are not required and coordinates should only be collected if they greatly enhance the ability to relocate the plot.

Because this technology is constantly changing, the detailed description for using the PLGR or other GPS units to collect coordinates for the location is in **Appendix E**.



## MARKING THE REFERENCE POINT (RP)

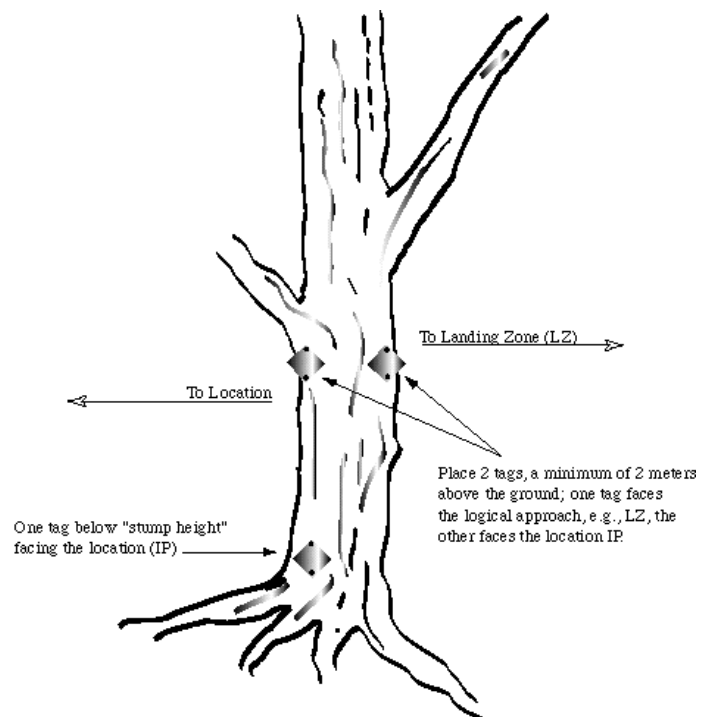
An enduring, easily identifiable object should be located near the plot as a RP. The reference point will help in reestablishing the plot in the event of fire, timber cutting, growth of understory, or some other change that would make future visual location of the plot difficult. It should be easily recognizable both on the photo and on the ground. A large tree, rock, seismic-line intersection, etc., can be used, but a durable tree is preferred. A reference point must be established even if the plot is visually located (witness trees can also be used as reference trees in this case).

### Reference Point Guidelines

Select a durable tree (or other object if a tree is not available) that is visible on the photos and will still be present in 10 years.

Record the RP tree species, diameter (nearest mm), azimuth, and distance (nearest dm) from RP to IP on the location record sheet, the back of the photo, and on three metal "Forest Survey Location Reference" tags. If a landmark other than a tree is used as a reference point, describe the object on the location record sheet.

Place one reference tag on the side of the tree facing the logical means of approach. Place others on the side facing toward the plot, one at 2 meters and one below stump height. Leave 2.5 cm. of nail exposed.



## **MARKING THE INITIAL POINT (IP)**

Place a pin or stake at the end of the line measured from the RP. If this point is obviously not the IP delineated on the photo, and the correct location can be determined, place a second pin at the correct location. Measure azimuth and distance from the first pin to the second pin and record this information under "comments" on the location sheet. Remove the first pin. The second pin becomes the IP.

If the IP (or any of the other points at the sample location) falls within a tree trunk, shift the point location back along the approach line, 1/2 meter from the edge of the tree trunk and mark this point with a pin. Point measurements will be taken from the pin; however, distance to the next point should be measured from where the point should have fallen.

## **WITNESS TREES**

Two witness trees (or other durable objects) must be located for the IP. These trees should preferably be:

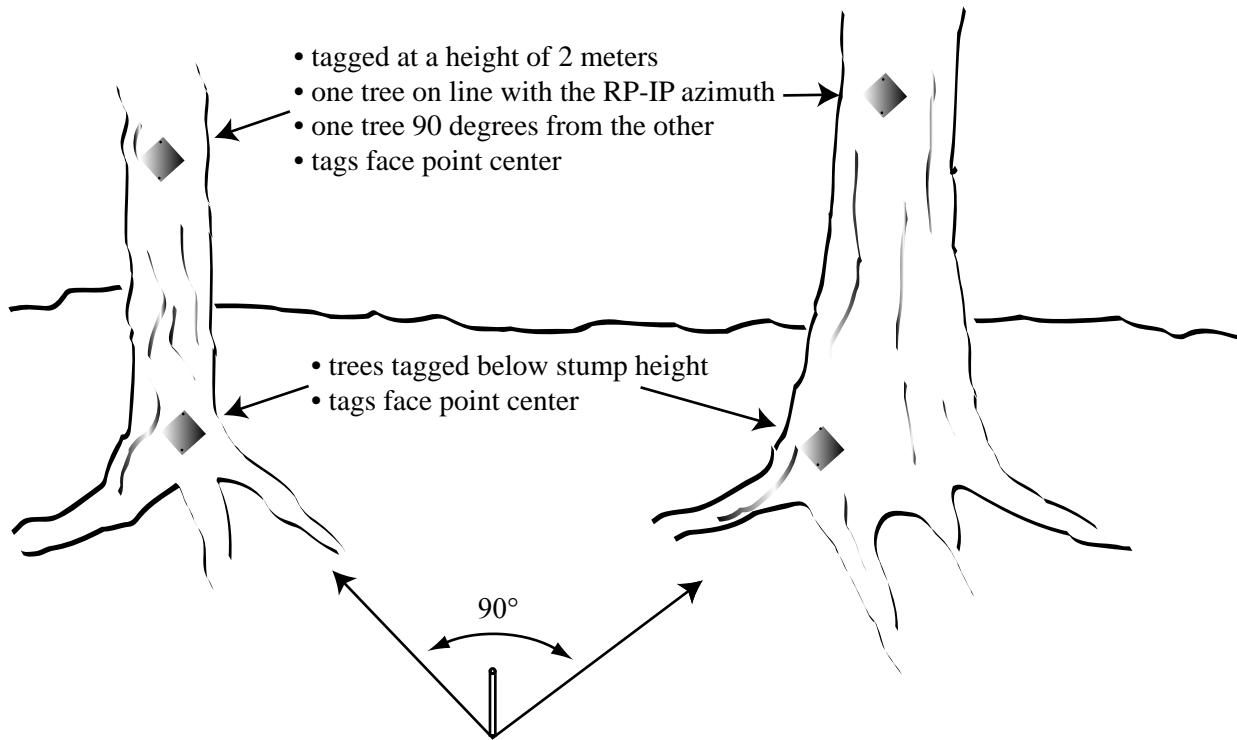
1. Not likely to die or be cut within 10 years.
2. A species easily located in the stand.
3. At least 10 cm. at DBH.
4. One tree in line with RP-IP azimuth, second tree at a 90° angle.

If no trees exist that meet these specifications, pick the best witness tree, shrub, or rock available.

Record the following information on the location sheet and on one Forest Survey location tag for each witness tree:

1. Azimuth from pin to center of tree at DBH (or an obvious point on an object).
2. Horizontal distance (nearest decimeter) from the center of the tree (or object) to a point plum with plot pin.

On the location sheet also record species and DBH (nearest mm.) for each tree.

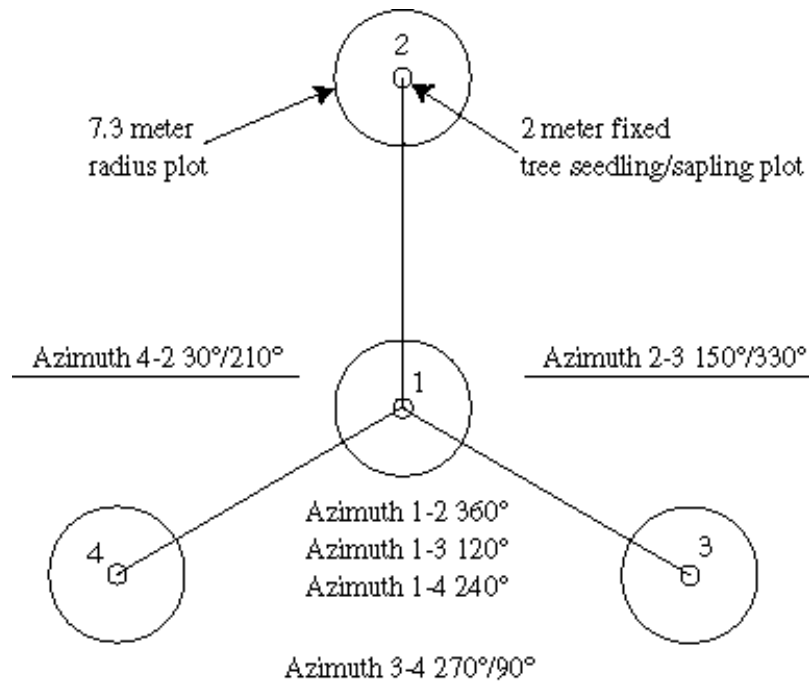


Tag each witness tree with two metal Forest Survey location tags on the side of the tree facing the sample point: one tag at a height of 2.0 meters; the other below stump height. Make a sketch of the area on the location sheet if it would help in relocation. If either tree is a tally tree put a remark in the Notes (F4 on the Husky) for the tree in the Tree Record.

## ESTABLISHING SAMPLE POINTS

Before establishing and beginning work on the sample points, be sure the Location Record is complete. See Section 2 for a complete description of the Location Record.

Four sample points will be established at each Location, as illustrated in the following diagram.



Sample pt. 2 is located 36.6 meters north ( $360^\circ$  magnetic) of pt. 1. Pts. 3 and 4 are also located 36.6 meters from pt. 1 at an azimuth of  $120^\circ$  and  $240^\circ$ , respectively. Note that after the IP (pt. 1) is established all other points can be established in any order as long as doing one point before another is not to avoid sampling a certain condition

Pts. 2, 3, and 4 can be established from each other without returning to pt. 1 by measuring 63.4 meters at the following azimuths and back azimuths:

Azimuth 2-3/3-2	$150^\circ/330^\circ$
Azimuth 3-4/4-3	$270^\circ/090^\circ$
Azimuth 4-2/2-4	$030^\circ/210^\circ$

While establishing points, be aware of changes in vegetation type and polygon type on the location. These types are described in detail in the Point and Polygon Record sections (Sections 3 and 4).

A Point and Polygon Record must be completed on the Husky for each sample point. See Section 3 for a complete description of the Point Record and Polygon Record.

### **Plots with Active Logging**

If you fly over or otherwise arrive at the sample location and find the area is being actively logged (timber has been or is being felled, bucked, or yarded): **DO NOT ESTABLISH THE PLOT**. Note on the plot folder the status of the logging operation and notify the field supervisor. The field supervisor will hold the plot until later in the season when the plot can be completed. At no time should the field crew enter an active logging area to establish a sample location.

### **POLYGON DELINEATION**

At each point, field crews will have to classify the land cover/vegetation into a polygon type. A *polygon* is **any area of homogenous vegetation cover .4 hectares (1 acre) or larger in area and greater than 35 meters in width**. On a location, one polygon type is separated from another polygon type by a well-defined and distinct boundary. **Areas less than .4 ha. but greater than .2 ha.** are considered *inclusions* within the main polygon. In cases where the sample point falls in an inclusion, the polygon will be classified based on the area around the inclusion that meets the criteria of a polygon.

It is possible that one or more of the four sample points will have more than one polygon type within the borders of the fixed radius plot. In cases where more than one polygon type exists the polygon borders will be mapped on a diagram of the point. See section 4, Polygon Record, for more information on polygon delineation.

## **FIXED RADIUS TREE AND SEEDLING/SAPLING PLOTS**

At each sample point, trees,  $\geq 12.5$  cm diameter at breast height (DBH), are tallied using a 7.3 m. fixed radius plot. Down trees (logs) are tallied only if more than 50% sound. Live trees  $<12.5$  cm DBH are measured on a 2.0 meter fixed radius seedling/sapling plot.

## **HORIZONTAL/VERTICAL VEGETATION PROFILE PLOT**

Complete the HV record on a paper data sheet. A 5.64 m. radius (100 sq. m.) HV plot is established and measured on the first point in each polygon type at the location. The HV is relocated to another point only if the sample point is on a **distinct** transition between two polygon types. Procedures are given in manual section 6, H-V Record.

## **DOWNED WOOD TRANSECT**

Establish and measure 3 downed-wood transects at each HV plot. Complete the downed wood record on the Husky (see Section 7).

## **SOILS PITS**

Excavate and measure a soils pit at a representative site at each sample plot. Complete the soils record on the Husky (see Section 8).

## **POST FIELD DUTIES**

After returning to camp review plot data and correct obvious errors. It is important to review each day's work while it is still fresh in your mind. Edit paper forms in pencil only. Complete the Field Review record on the Location Form (see Location Record: Field 2-5).

### **Specific items to complete**

- Check-in with field supervisor
- Check all records in Husky for completeness
- Check all hardcopy datasheets for completeness
- Check all photo work for completeness
- Review notes on Location Record and other notes
- Review sketch map on Location Record
- Recheck HV plant codes and percentage estimates
- Key all unknown plant species
- Check saved waypoints in Husky
- Place GPS and Radio batteries on charger
- Secure all firearms
- Turn in exposed rolls of film
- Backup Husky and run formal data edits on laptop  
(look for supplemental manual near computer)
- Print out final hardcopy of data and store it in the location folder

When a location is completed, the folder with all of the data forms and photos must be given to the field supervisor. The crew leader is responsible for seeing that the location is complete and ready for office edits.

## **MAINTAINING PLOT INTGERITY**

Each crew is responsible for preventing unnecessary damage to current or prospective sample trees, saplings, seedlings, and other resources. Because plots will be remeasured in the future, it is desirable to ensure that observed changes are representative of the landscape as a whole and not due to activities of previous field crew.

The following activities are allowed subject to conditions from the landowner / managing agency. For example agencies that manage wilderness areas may request that tree tags not be used because that detract from the “wilderness experience” of recreationists. Always check plot folder or with field supervisor for special instructions prior to beginning inventory procedures.

The following field procedures are permitted unless stated otherwise.

- Nailing tags on reference and witness trees so that plot and subplot centers can be relocated.
- Boring of trees for age and radial growth to determine tree age, site index, stand age, or for other reasons.
- Nailing, tagging, and marking with lumber crayon trees and saplings on so that these trees can be relocated, identified, and measured efficiently and positively at times of remeasurement.



The following practices are specifically **prohibited** within the entire plot area including all subplots. This area is defined by a 50m-radius circle around the IP:

- Collecting natural artifacts such as stem burls, antlers, flowers, cones, bird nests, etc is prohibited.

Removal of stem burls creates open wounds on trees that may allow for greater opportunity for disease or insect attack. Removal of other items may alter natural ecological patterns.

- Building fires is prohibited.

Hot prolonged fires can kill soil microorganisms thus serializing the soil. Additionally, the amount of down wood on the plot is altered.

- Excessive limb removal is discouraged.

It is recognized that it is necessary to remove dead limbs from some species such as spruce but remove the absolute minimum. Removal of live limbs is strictly prohibited as it reduces plant vigor and open wounds provide opportunity for insect and disease attack. Limbs should not be removed on witness and reference trees to facilitate observation of tags with the exception of trees located off-plot (>50.0 m from IP).

- Chopping vines from tally trees.

Vines are components of the forest ecosystem and thus should not be damaged. To ensure accurate tree measurements, vines should be pruned away from tree trunks and measurement tape placed underneath. If this is not possible, alternative tools (calipers, biltmore sticks) should be used.

- Discarding trash is strictly prohibited.

This includes biodegradable items such as apple cores and grape seeds. These items have the potential of sprouting thus changing the species composition of the site.

- Boring and scribing of some specific tree species.

Tree species such as quaking aspen are particularly vulnerable to disease when open wounds are created. Check with field supervisor for current procedures.

## SECTION 2 LOCATION RECORD

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## Introduction

The Location Record Form is used to keep track of various information regarding the plot location: Records of all the photos taken at the location, who collected various information, GPS, reference and witness tree documentation, and most important, comments and sketch map about all aspects of the location.

The location form is one of the best ways for the crew to communicate any information that might be of importance to editors, analysts, and crews who will be re-measuring the location in future years. The location form should be used for information pertaining to the location as a whole. Notes on individual points, polygons, trees, H-V's, downed wood, or soils are welcome on the location record but must also be entered on the respective point, polygon, tree, H-V, downed wood, and soils records.

Photos are used to document certain plots on the location. Stereo photos are required on the points where H-V profile plots are established. General type photos are stereo photos taken to include a view that is typical of the vegetation type.

The following items must be included on the Location Record:

- Plot Location ID
- Date
- GPS Data
- RP and witness tree data
- Sketch map
- Photo numbers
- Data source
- Image type

The following items must be noted in the **Notes** section of the Location Record:

- Crewmembers on plot
- Description of Landing Zone
- Simple description of vegetation for the plot as a whole and each point
- Conditions on plot: weather, snow patches, blowdown
- Any problems

### **FIELD 2-1    Location Number**

Record the designated 3-alpha 4-digit sample location number found on the plot folder or back of the plot photo. Example: JNU0223

### **FIELD 2-2    Dates**

Start Date: Enter the date that sampling was started on the location being measured. Record as a six digit code. Example: July 5, 1995 record as 07/05/95.

End Date: Enter the date that sampling was completed on the location being measured. Record as a six digit code. Example: July 5, 1995 record as 07/05/95.

Note: In most cases the location will be completed in one day in which case the start and end dates will be the same.

## FIELD 2-3 Image Type

Check off the box next to the type of imagery that was used in the location of the sample location. This should be the imagery where any measurements, documentation, calculations, or notes were made.

### DESCRIPTION

- ortho photo (original or pseudo)
- color infrared aerial photos (copies or originals)
- satellite imagery (SPOT, LandSat, etc.)

## FIELD 2-4 Data Source

Record the appropriate code regarding how data was obtained.

- **FLY:** When aerial observation only determines the plot to be inaccessible, barren, out-of-unit data, or otherwise determines that a ground-based attempt is not justified. A note must be included on the Location Record.
- **GROUND:** When ground-based observations result in all the data being collected or a determination of inaccessible, barren, out-of-unit data, or other being made. This should be the code used most often.
- **OFFICE:** When office based activities such as photo interpretation determines that any field-based attempt is not justified. Field crews should not have reason to use this code.

## **FIELD 2-5     Examiner's Initials**

Back at the lab or field camp, a final review of is typically done at the end of the day. The crewmember that completes the final review of a particular portion of the data should enter their initials on the respective line. This list also provides a checklist of items that need to be completed shortly after returning from the field.

Location Recorder's Initials: Record the initials of the crewmember that is responsible for final edit of location documentation and aerial photo work.

Point and Polygon Recorder's Initials: Record the initials of the crewmember that is responsible for final edit on the point and polygon records in the Husky.

Tree Recorder's Initials: Record the initials for the crewmember responsible for final edit of the tree record in the Husky.

Down Wood Recorder's Initials: Record the initials for the crewmember responsible for final edit of the down wood record in the Husky.

Soils Recorder's Initials: Record the initials for the crewmember responsible for final edit of the soils record in the Husky.

HV Initials: Record the initials of the crewmember that is responsible for final edit of the HV record.



Data Backup Initials: Record the initials of the crewmember that is responsible for downloading the plot data to the laptop, running the edit check program, backing the data up to the RAM Cartridges, and printing a hard copy of the data.

Field Editor's Initials: Record the initials of the crewmember responsible for making sure the overall data for the sample location is complete and accurate. This person ensures all data sheets, aerial photos, printouts, and other materials are in the plot folder; and turn it in to the field supervisor.

## **FIELD 2-6    GPS Information**

For each set of coordinates location record the following data.

- GPS unit number: hand written on front of unit
- WP number: assigned by PLGR unit
- WP name: assigned by field crew (see Item I, Appendix D)
- Latitude: degrees / minutes / seconds
- Longitude degrees / minutes / seconds
- Error: (+ / - m)
- Hits: approximate number (350, 180, 25, etc)

See Appendix E for detailed instructions on using GPS.

## **FIELD 2-8    RP - IP Reference**

Record Species, DBH (mm), Distance (dm), and Azimuth RP to IP (mag) from the reference tree to the sample location as calculated from the Ortho photos. Distance is recorded to the nearest decimeter (dm). For species, use species codes found in the Tree Section (Field

5-6). If the reference is not a tree write in what the object is and make a note in the Field Notes (for information on establishing a reference tree see the General Instruction Section).

### **FIELD 2-9 IP Witness 1**

At the Initial Point (IP) record the species (see Tree Record - Field 5-6 for valid codes), DBH (mm), azimuth point to witness (mag.) and distance (dm) from the point center to the first witness tree. See the General Instructions section for information on witnessing the IP. On nonforested plots record species and DBH only if it is applicable and make a note in the Field Notes as to what was used for a witness (for information on establishing witness trees see the General Instruction Section).

### **FIELD 2-10 IP Witness 2**

Record information for a second witness tree on point 1.  
See the instructions for IP Witness 1.

### **FIELD 2-11 Initial Point Photo with Plot Folder**

Take 2 photos, preferably looking across the IP, with the location folder (and location ID) clearly visible in the viewfinder. Record the frame numbers for these photos. Note: If the plot is not completed in one day and the camera is used in the interim, be sure to re-photograph the location folder when returning to the plot. Note these additional frames in the notes section adjacent to this field.

## **FIELD 2-12 General Type Photos**

Take at least one stereo photo pair (left then right) of the general area. The photos should typify the vegetation at the location. Record the photo frame numbers (If more than one stereo pair is taken record the starting and ending frames; it will be assumed the photos will be in left/right pairs).

**Stereo photos** can be easily acquired using the following procedures:

Take the first photo of the subject making sure to note which part of the subject falls in the center of the frame.

Move the camera horizontally to the right (don't move it up or down) approximately 2 decimeters and take the second photo with the same part of the subject centered in the viewfinder.

Depending on how far you are from the subject, small deviations from the above methods won't detract from the stereo effect. A simple aid in taking these photos in forested areas is to select a tree about a decimeter in diameter and take the left and right stereo photos on opposite sides of the tree.

## **FIELD 2-13 Horizontal-Vertical Plot Stereo Photos**

At each H-V profile plot, a stereo pair (left then right) will be taken of the profile panel as viewed from south to north across the width of the plot. In extreme cases, , when dense brush, poor lighting, or terrain in the S to N direction will lead to a poor photo, the stereo pair may be taken in any of the cardinal directions across the plot. Make a note in the comment section of where the photo was taken and why. Record the photo frame numbers.

## **FIELD 2-14   Miscellaneous Photos**

Miscellaneous photos can and should be taken to help illustrate unusual situations, uncommon vegetation, etc. Record the frames of the photos taken and be sure to write comments about the photo subject. Inaccessible plots that can be photo documented should be recorded here.

### **PHOTO TIPS**

#### **Switching Rolls of Film within a Location:**

Care should be taken to try and get all the photos for a location onto one roll of film. If there are less than eight (8) exposures left on the field camera before the location is started then rewind the film and start a new roll before taking any pictures.

#### **Lighting:**

Occasionally in forest conditions the lighting is low. Even though 200 ASA film is used for the field photos slow shutter speeds will be encountered. Great care should be taken to keep the camera steady. If a tree is convenient use it to steady the camera. Also, do not take photos looking into the sun. Try to shoot the photos with the sun at your back.

#### **Horizontal vs. Vertical Format:**

Remember that the camera can be turned on its side to capture taller subjects in a vertical format. Use the horizontal format to take photos of wider, shorter subjects. Use the format that best covers the subject, or use both.

## **FIELD 2-15    Field Notes (notes about the location)**

Use this space to include information on any aspect of the plot location that might aid in the analysis or relocation of the sample location. Any other remarks that might outline problems or interesting things related to the location are encouraged to be written here. . Feel free to draw diagrams on the back of the record that might help future crews locate the reference.

## **FIELD 2-16            Location Diagram**

Use the location diagram to visually depict the polygon boundaries in relation to the four sample points in addition to any distinct features that exist on the location (streams, ponds, openings, rock outcrops, etc.).

# SECTION 3

## POINT RECORD

Field No.	FIELD DESCRIPTION	Page
	Introduction.....	2
	Required Fields .....	3
3-1	Point Number.....	3
3-2	Recorder's Initials .....	3
3-3	Slope .....	3
3-4	Aspect .....	4
3-5 thru 13 (odd)	Animal Sign.....	5
3-6 thru 14 (even)	Animal Species .....	6
3-15	Notes.....	7

## INTRODUCTION

A point record must be completed for each of the 4 sample points at a location. The point records will be completed on the Husky field computer. The data for the Point Record must be completed for a point before beginning Polygon Records and Tree Records for that point. See Section 1, General Instructions, for instructions on establishing the points.

In the Husky point record, required fields are indicated by underscores (\_). The Notes field is accessed from the point record by pressing the F4 function key, typing in the notes then pressing the YES (Enter/Return) or F4 key to save the note or ESC to exit notes without saving. Notes should be used freely to describe any unusual situation that is encountered.

## POINT RECORD REQUIRED FIELDS

All possible fields:

Pt Ini Slp As S1 A1 S2 A2 S3 A3 S4 A4 S5 A5

-----

Record wildlife data (S1 - S5, and A1 - A5) for up to five combinations of wildlife sign and species.

## POINT RECORD FIELDS

**FIELD 3-1 Point Number (Pt)**

Point numbers (1-4) are filled in automatically on the Husky. Each point is represented by a separate line. Within the Point Record each point can be accessed by using the Page Up or Page Down keys.

**FIELD 3-2 Recorder's Initials (Ini)**

All three initials (or two letters with no middle name) of person recording point and tree records for this point.

### FIELD 3-3 Slope (Slp)

Record slope percent for the area across the plot (approx. 20 meters). If the slope is uneven across the point then take an average. Record to the nearest percent.

**Note:** If the point cannot be physically located then record 999 for the slope of the point. Explain why the point could not be visited in the



Notes screen (Function key F4). If the point is inaccessible then the Aspect must be coded 99 as well.

### **FIELD 3-4 Aspect (As)**

Consider the point as a unit and measure primary aspect of that unit. Record magnetic azimuth down slope to the nearest 10 degrees, divided by 10 (e.g. 180 degrees = 18). North is coded 36 (360 degrees), not 00. If there is no slope (0%), or aspect is not apparent, as in multiple aspects, use one of the following codes:

#### **CODE DESCRIPTION**

- 37 ridgetop - terrain falls away on 2 or more sides of plot
- 38 valley - terrain rises on 2 or more sides of plot
- 39 flat - slope almost 0% in all directions
- 40 undulating - slope/aspect continuously changing across plot
- 99 Inaccessible Point (make note in the note screen)

**Note:** If the point cannot be physically located then record 99 for the aspect of the point. Explain why the point could not be visited in the Notes screen (Function key F4). If aspect is coded 99, slope is usually coded 999.

## **FIELDS 3-5,7,9,11,13 Animal Sign (S1,S2,S3,S4,S5)**

Record Animal Sign observed within a 5.64 m. circular (HV size) or surrounding polygon. If sign is on the 5.64m HV plot record the standard codes listed below. If the sign is off the HV plot but within the same polygon add 20 to the code. For example a ground nest on the HV plot would be coded 14 and off the HV but in the polygon it would be coded 34 (14+20). Use corresponding Animal Species code (A1 - A5) to record animal producing the observed sign.

CODE	DESCRIPTION	CODE	DESCRIPTION
01	scat, pellet group	12	feeding on vegetation
02	track	13	nest: over water
03	trail, runway	14	nest: on ground
04	den: hollow/fallen tree	15	nest: raised in stump
05	den: rock cavity	16	nest: suspended in veg
06	den: excavated soil	17	nest: live tree branches
07	burrow, tunnel	18	nest: dead tree branches
08	lodge, bedding area	19	cavity nest
09	food cache/midden	20	animal sighting/hearing
10	rubbed tree	50	remains (antlers, bones)
11	clawed tree		

## **FIELDS 3-6,8,10,12,14 Animal Species (A1,A2,A3,A4,A5)**

Specific animal (or apparent group if specific animal cannot be identified) producing recorded animal sign. Groups are capitalized below.

CODE	DESCRIPTION	CODE	DESCRIPTION
01	beaver	52	caribou
02	porcupine	53	deer
03	raccoon	54	elk
10	RODENT	55	mountain goat
11	ground squirrel	56	Dall's sheep
12	flying squirrel	57	bison
13	tree squirrel	58	muskox
14	marmot	60	GAME BIRD
15	chipmunk	61	grouse
16	woodchuck	62	ptarmigan
17	muskrat	63	duck
18	lemming	64	goose
19	vole/mouse	65	crane
20	BEAR	66	snipe
21	black bear	70	NON-GAME BIRD
22	grizzly/brown bear	71	water shore bird
23	polar bear	72	woodpecker
30	LAGOMORPH	73	passerine (perching bird)
31	pica	74	RAPTOR
32	hare	75	eagle
40	FURBEARER	76	hawk
41	wolf	77	falcon
42	coyote	78	owl
43	fox	79	osprey
44	lynx	80	OTHER
45	river otter	81	shrew

46	wolverine	82	bat
47	mink	83	amphibian
48	marten	84	reptile
49	weasel, ermine	85	fish
50	UNGULATE	86	domestic
51	moose	99	UNKNOWN

## FIELD 3-15 NOTES

Record up to 70 characters of comments regarding the given point. Access the Notes field from the Husky point record by pressing the F4 function key. Enter the notes for the point then press the Yes (Enter/Return) or F4 key to save the note or press Esc to exit notes without saving the changes. If more than 70 characters are needed, use the available space to refer to a note on paper (e.g. on the location form).

## SECTION 4

### POLYGON RECORD

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Polygon defined .....	2
Polygon Record: Required Fields .....	3
Polygon Delineation.....	8
Point Type Classification.....	4
4-0a      Location Number .....	14
4-0b      Date .....	14
4-1      Polygon Number .....	14
4-2      Point Center Flag .....	14
4-3      Land Cover Type .....	15
4-4      Forest Density .....	20
4-5      Forest Stand Size.....	21
4-6      Forest Stand Origin .....	21
4-7      Main Vegetation Type .....	22
4-8      Percent Area .....	27
4-9      Stocking Condition .....	28
4-10      Soils F-Series .....	29
4-11      Canopy Structure Class.....	36
4-12      Polygon Record Notes .....	37

## INTRODUCTION

Polygon Record must be completed for each of the 4 sample points at a location. The polygon records will be completed on the Husky field computer. Each sample location will have at least one polygon type associated with it. A polygon type is made up of four variables that include: Land Cover Type (LCT), Forest Density (FD), Forest Stand Size (FSS), and Forest Stand Origin (FSO). Other information about the land cover and the size of the polygons are also collected but do not change the polygon type.

## POLYGON DEFINED

A *polygon* is **any area of homogenous vegetation cover greater than 0.4 hectares (1 acre) and greater than 35 meters in width**. On a location, one polygon type is separated from another polygon type by a well-defined and distinct boundary. **Areas of homogenous vegetation cover less than 0.4ha but greater than 0.2ha** are considered *inclusions* within the main polygon. In cases where the sample point falls in an inclusion, the polygon will be classified based on the area around the inclusion that meets the criteria of a polygon.

An example of an distinct type change would be an alpine zone alder stand next to a closed Sitka spruce stand or a closed spruce-hemlock stand next to a spruce-hemlock clearcut.

It is common for a point to have more than one polygon type within the borders of the fixed radius plot. In cases where more than one polygon type exists then all of the polygons must be classified, entered in the polygon record, and mapped on the Location Record.

## POLYGON RECORD 2

## POLYGON RECORD: REQUIRED FIELDS

All possible fields:

PN PC LCT FD FSS FSO MVT PA SC SFS  
CSC — — — — — — — —

LCT = 00 Non-accessible Polygon

PN PC LCT FD FSS FSO MVT PA SC SFS  
CSC — — — — —

LCT <10 Nonforested Land Cover Type

PN PC LCT FD FSS FSO MVT PA SC SFS  
CSC — — — — —

LCT >10 Forested Land Cover Type

PN PC LCT FD FSS FSO MVT PA SC SFS  
CSC — — — — — — — —  
—

## POLYGON TYPE CLASSIFICATION

Each location is classified into polygons types based on: Land Cover Type (LCT), Forest Density (FD), Forest Stand Size (FSS), and Forest Stand Origin (FSO). Think of these four variables as one unique variable, the polygon type. If any one of the four variables that make up polygon type is changed a whole new polygon type is created. Unique combinations of these fields yield different polygon types. No other variables collected on the Polygon record affect the polygon type.

Polygons are large homogenous areas that must be 0.4ha (1 acre) in size. In classifying a location into polygon types, the recorder must be careful not to break areas into separate polygons unless there is a well defined distinct difference. If the polygon boundary crosses the 7.3 m radius plot the differences between polygon types must also be abrupt in order to be mapped. For example, on any given point, polygons 1 and 2 in the table below have different polygon types because they have different Forest Density Values.

	Land Cover Type	Forest Density	Forest Stand Size	Forest Stand Origin
polygon 1	42	8	3	1
	(forest Sitka spruce) regenerated)	(80% crown cover)	(Sawtimber)	(Natural

Land Cover	Forest	Forest Stand	Forest Stand
---------------	--------	-----------------	-----------------

POLYGON RECORD 4



	Type	Density	Size	Origin
polygon 2	42	6	3	1
	(forest Sitka spruce) regenerated)	(60% crown cover)	(Sawtimber)	(Natural)

Two polygons are of the same polygon type only if they have the same values for LCT, FD, FSS, and FSO. For nonforest Polygon Types (Shrub, Herb, Barren Land, and Water), FD, FSS, and FSO are not recorded, so the polygon type is simply the Land Cover Type (LCT).

The Main Vegetation Type (MVT) does not change polygon type, but because it describes the vegetation on the polygon it is closely related to the polygon type variable. The Sitka spruce stand above would be coded as MVT=1A1A Closed Sitka spruce not 1A2A Open Sitka spruce. In rare cases, the Polygon type and the MVT will not agree. Forested lands that have been burned or recently clearcut would be one case where the polygon type is forested but the MVT could be classified as shrub or herbaceous. The level 5 MVT call can vary from point to point but generally should remain consistent throughout the location.

It is important to know that growth, site, and age trees, and HV data are collected based on polygon type (LCT, FD, FSS, FSO). For each unique polygon type on a location, the field crew will measure 3 site trees, 3 age trees, as well as 1 growth tree for each new species and diameter class encountered (Note: on polygons with a LCT code for Sitka spruce, hemlock, or both, site will be determined by soils F-series and site trees will not have to be collected).

## POLYGON RECORD 5

Because the Husky prompts for growth trees based on polygon type, and produces a count of site and age trees for each polygon type, LCT, FD, FSS, and FSO must be recorded for each polygon on a point before beginning tree records for that point.

It is important to remember that polygon type is only controlled by LCT, FD, FSS, and FSO. While the other variables collected on the Polygon Record are related to the polygon type, they are not part of the criteria for defining a polygon and will not result in a change in polygon type. These variables can change from point to point but they generally are similar throughout the polygon.

### **Inclusions**

An inclusion is an area of markedly different vegetation and between 0.4 and 0.2ha in size. An inclusion is part of the surrounding polygon and thus the LCT, FD, FSS, and FSO are taken from the surrounding area, which is closest in characteristics to the inclusion and meets the other requirements of a polygon.

### **Dwarf Tree/Krummholz Vegetation Types**

Special considerations must be given to dwarfed tree and krummholz vegetation types. In Southeast Alaska, some stands of mtn. hemlock in the alpine zone and mixed conifer stands in low site/muskeg conditions will only grow in a dwarf shrub-like state for which normal tree measurements are difficult to apply. **Stands of trees in this state will be recorded as shrub types** if less than 10% tree cover is comprised of individual trees that currently or potentially will contain a 4 meter merchantable log. These stand will have an LTC = 02 (shrub) and MVT = 2xxxxx (Dwarf tree). Always make a note in the Polygon Notes (Field 4-12) when treating a stand as dwarf tree / krummholz.

### **Classifying Clearcuts**

In many areas of Southeast Alaska forest stands have been clearcut. When these circumstances are encountered the polygon type and the MVT will not always agree. If forestlands are cut they are still considered forestland unless the land is also permanently altered for another use (parking lots, buildings, etc.).

Clearcuts are recorded as forestland with LCT based on existing vegetation is stocked with trees. If unstocked estimate an LCT from the previous stand.

However, MVT is always recorded to the 4<sup>th</sup> level based on existing vegetation type and coded at level 5 as clearcut (98).

Clearcuts must be described in the Polygon Notes (see Field 4-12).

### **Points with Snow**

Depending on the elevation and aspect, certain sample locations may have snow covering part or all of a sample point. Every effort should be made to avoid locations until the snow has melted off but, in some circumstances the location will have to be sampled. In the event that snow is covering some of the sample points do the following: 1) locate all H-Vs on points without snow 2) Estimate the LCT and MVT as best as possible and describe the situation under the Polygon Notes (see Field 4-12).

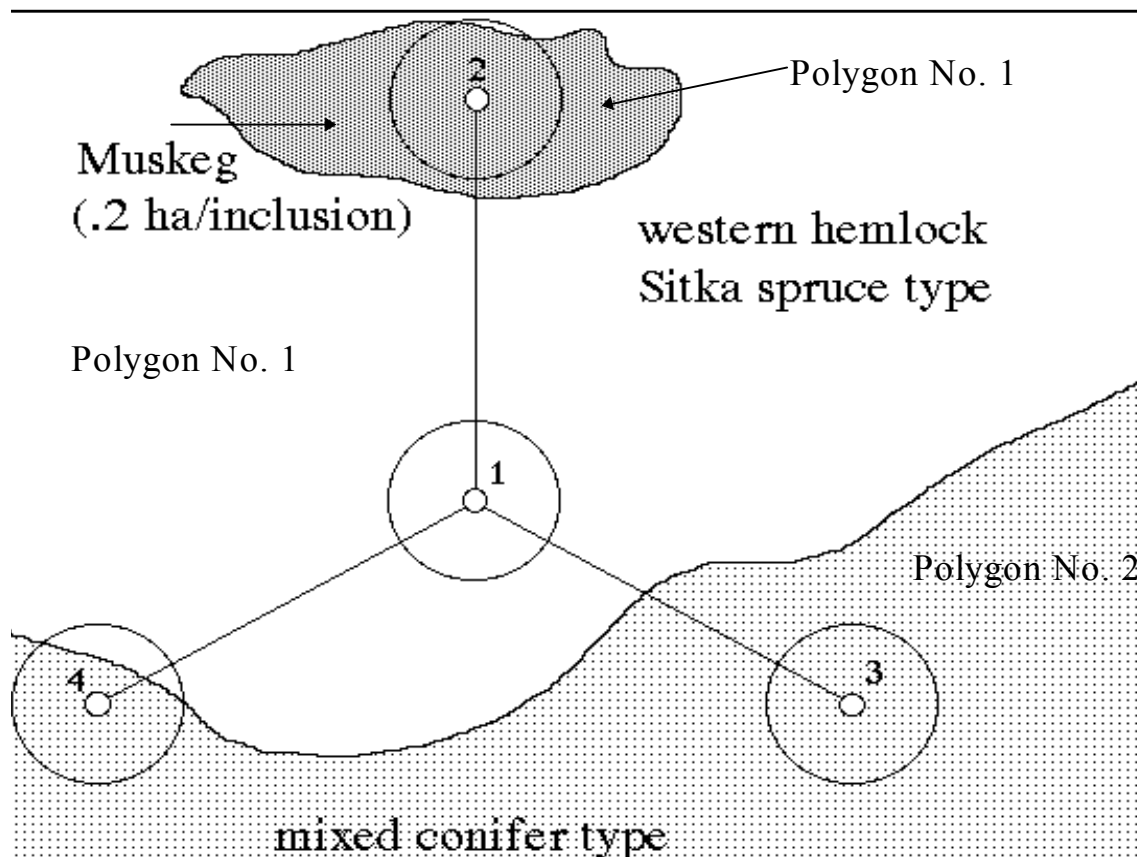
## POLYGON DELINEATION

Care should be taken when delineating polygons. Polygons should be delineated based on obvious differences in polygon type attributes.

While some variability will exist within most polygons, do not map polygon boundaries based on minor variations within an obvious type.

*A polygon is any area of homogenous vegetation cover greater than 0.4 hectares (1 acre) and greater than 35 meters in width.*

Polygons are mapped at 2 different levels. First a sketch map is drawn on location record showing the different polygons and inclusions in relation to the four points. The figure at the bottom is a typical example. Secondly, polygon boundaries that falls directly on a point – resulting in a “split point” - requires mapping the point to determine the relative area of each polygon. Point 4 in the figure



below shows a “split point” (see Field 4-8: Percent Area for information on mapping the point).

In the above diagram point 1 falls distinctly in the hemlock-spruce polygon type (Poly No. 1). Point 2 falls in a muskeg that is .2 ha in area and thus does not meet the minimums for a polygon. Pt. 2 is coded as in the hemlock-spruce polygon type (poly 1) and treated as an inclusion. The MVT for point 2 would be a hemlock-spruce type on the polygon record but would be a muskeg type on the HV record with the inclusion flag marked. Point 3 falls distinctly in a mixed conifer type. Point 4 is split between two types and would require the point be mapped (see Field 4-8: Percent Area for information on mapping the point).

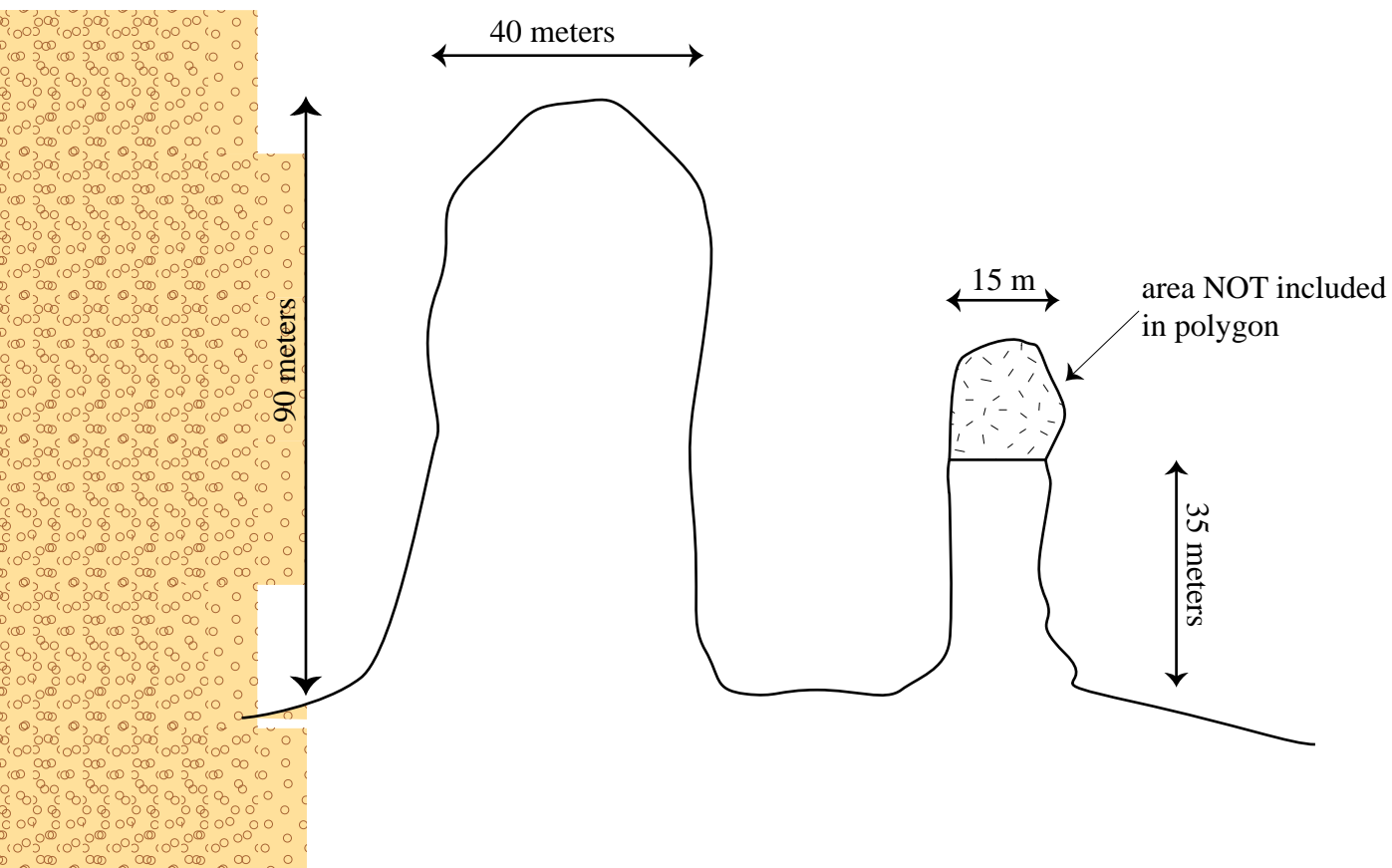
### **Exceptions for delineating a polygon**

- 1) **Cultural stringers** (constructed roads, railroads, powerlines, pipelines and canals)  $\geq .4$  ha. are classified as a separate polygon **regardless of width**. If a “cultural stringer” polygon is justified, there should be only one and all roads, powerlines, etc placed within it. Cultural stringers have an LCT = 07 (Barren – Land) and MVT = 7F3.
- Constructed roads are intended for car and truck travel, not for skidding logs and must be “constructed” and not made by car and truck use.
- Cutbanks associated with road construction are included in the cultural stringer polygon.

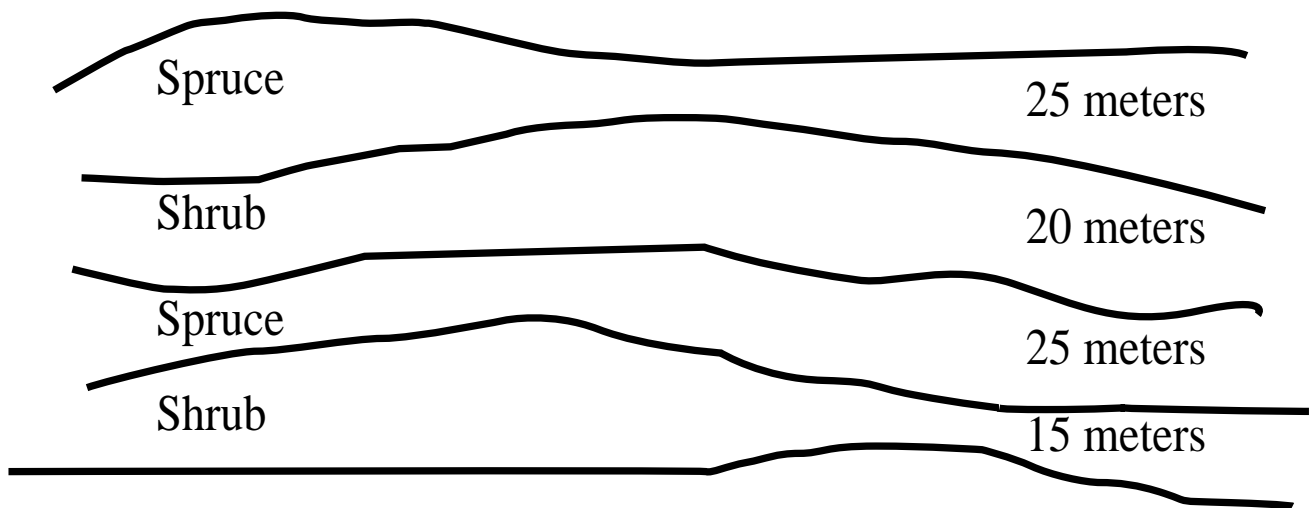
- Road Fill is considered part of the cultural stringer. Except when forest preexisted and fill was dump around large timber. These areas will be considered a forest polygon provided they meet all the other requirements of a polygon.
- 2) When measuring cultural stringers include all areas that have been manipulated and are kept in an altered state through maintenance.
  - 3) **Streams** which are both  $\geq 10.0\text{m}$  wide and  $\geq 0.4$  ha are classified as nonforest. When measuring stream width include all areas (including margins, gravelbars, and islands) where the action of water prevents the growth of trees to merchantable size. Streams have a LCT = 08 (Barren – Water) and MVT = 8xx depending on the type and size of water (see appendix A).
  - 4) **Maintained Structures** are classified as cultural stringers even when the structure and surrounding site is  $< 0.4$  ha. Any part of the site around the structure that is maintained (cleared, brushed, sprayed, or mowed) will be included in the area of the structure. Cultural stringers have an LCT = 07 (Barren – Land) and MVT = 7F3.

5) **Stringers and Necks:** Boundaries between polygons are not always straight but consist of stringers and necks. To be included in a polygon the following criteria must be met.

- **Stringers:** are large extensions of a polygon and must be at least 35 m. wide. They have no length limitations but generally are longer than 35 m. in length.
- **Necks:** are smaller more narrow extensions of a polygon and are less than 35 m. wide. Only the first **35 m of length** are considered part of the polygon. Beyond this distance, the neck is considered too much of an extension to be part of the original polygon.



6) **Intermingling Vegetative Strips & Clumps** are large areas where several land cover types occur in narrow strips or clumps, each less than the 35 m. wide or 0.4ha minimum. When this condition occurs classify the area to the vegetation that hierarchically dominates the cover (i.e. trees are dominant over shrubs so intermingling strips of forest and shrub would be classified as a forested type with shrub inclusions).



Intermingled types would be classified as spruce in this instance

## 7) **Out of Unit**

The Coastal Alaska Inventory Unit contains a large expanse of coastline. Because ocean is considered out of the inventory unit, special care must be taken to determine if all or part of a plot is in the inventory unit or not. Where rivers or canals enter bays or estuaries, the river/canal will terminate where its width exceeds 1/4 nautical mile. If the plot, one or more points, or even a portion of a single point falls on the shoreline use the high water line (mean high tide) to delineate what part of the point is out of the unit.



If the IP falls out of the unit the entire sample location is considered out of the unit and nothing is measured on the entire plot.

If a point center - for points 2-4 - falls in ocean that entire point is out of the unit and will not be measured.

If the point center is in a normal polygon type but part of the fixed radius plot is out of the unit (in the ocean), treat the point like a split point with 2 polygon records. The first polygon record will be for the regular polygon type and will include the point center. Conduct all normal data collection activities on the polygon. The second polygon record will be for the out of unit portion and no additional data collection activities are required. Be sure to map the boundary on both the Location Record and the Point Mapping Sheet.

## **FIELD 4-0a Location Number**

Record the designated 3-alpha 4-digit sample location number found on the plot folder or the face of the ortho photo. Example: DLG0223

## **FIELD 4-0b Point Number**

Enter the point number that is being measured. Point number is only entered once at the startup of the Husky polygon record.

### **For each polygon the following is recorded:**

## **FIELD 4-1 Polygon Number (PN)**

Polygon number is automatically assigned by the Husky based on LCT, FD, FSS, and FSO. If either LCT, FD, FSS, or FSO are changed on subsequent points a new polygon will be formed.

## **FIELD 4-2 Point Center Flag (PC)**

Indicate if the center of the current point being measured is contained within the polygon.

CODE	DESCRIPTION
------	-------------

Y	point center is contained in the current polygon
N	point center is not contained in the current polygon (mapped points only)

## FIELD 4-3 Land Cover Type (LCT)

Record the land cover for the current polygon being measured.

**NONFOREST LAND** is land that has never supported forests and lands formerly forested where forest establishment is precluded by development for other uses. This includes areas used for crops, improved pasture, residential areas, parks, improved roads and adjoining clearings ( $\geq 20$  m. in width), powerline clearings, and .4 ha.-16 ha. (1 to 40 acres) of water classified by the Bureau of Census as land.

Ex. 1: Black spruce bog with less than 10% tree crown cover and no stumps or logs which might indicate that it was once 16.7% stocked. THE MERE PRESENCE OF TREE SEEDLINGS OR SAPLINGS DOES NOT INDICATE A FOREST PLOT.

Ex. 2: A plot lying between stringers of trees if there is no evidence that it was formerly forested even if you believe natural succession will make the area forested in the future.

Ex. 3: A mtn. hemlock krummholz stand with less than 10% cover in trees that do not have now or in the future a straight log. Krummholz stands are considered shrub types (LCT = 2; MVT = 2A \_ \_).

**FOREST LAND** is at least 16.7 percent stocked (10% tree crown cover) by forest trees of any size, or formerly having such tree cover. Does not include lands currently developed for nonforest uses such as residential areas, parks, orchards, or improved roads even if they include trees.

Forest land would include areas which have been cut, burned over or flooded if there is evidence that the polygon formerly had 10% tree cover. Transitional areas near rivers or glaciers which have never supported forest and which do not have 10% crown canopy coverage should be considered nonforest even if successional trend indicates these areas will eventually be forested.

**INACCESSIBLE** points are where the point center could not be reached. Record LCT as 00 and type “LCT=xx MVT=xxxxxx” in the notes, where x’s are best estimates of the LCT and MVT. Code the Percent Area of the inaccessible polygon as usual. For inaccessible points only the Location, Point, and Polygon records need to be completed. If the entire plot is inaccessible complete the applicable portions of the Location Record and return the plot folder directly to the field supervisor.

Every effort should be made to document the inaccessible location or point with photos. Record photos on the Location Record under Misc. Photos.

LCT Types:

<u>Nonforest LCT</u>	<u>Code</u>
Inaccessible	00
Shrub Land	02
Herbaceous	03
Barren - Land	07
Barren - Water	08

Forested LCT Types on next page.

<u>Forested LCT</u>	<u>Code</u>	
	black spruce	12
	tamarack	15
	white spruce	16
	wh/blk spruce	17
	spruce-birch	18
	blk spruce-tamarack	19
	hemlock-Sitka spruce	40
	w. red cedar - w. hemlock	41
	Sitka spruce	42
	mountain hemlock	44
	mixed conifer	45
	lodgepole pine	46
	western hemlock	48
	AK cedar - w. hemlock	49
	red alder	81
	poplar-birch	82
	mixed hardwoods <sup>1</sup>	88
	paper birch	92
	poplar	93

---

<sup>1</sup> When using the mixed hardwoods LCT, describe the composition of the stand in the polygon notes. The true LCT can be computed and with your description, classified into a new type not noted in the LCT list.

### Southeast Alaska Forest Land Cover Types

Use the following table to determine the proper forest type. See the following page for procedures on the use of the table. Using the appropriate list of types (softwood or hardwood), test the definitions *in the order given* and assign forest type based on the first successful test.

<u>Forest Type</u>	<u>LCT</u>	<u>Major species</u>	<u>Definition</u>
<b>Softwoods</b>			
western hemlock	48	263	$263 > 50\%$ and $(098 + 108 + 264 + 042 + 242) < 30\%$
w hemlock-spruce	40	263, 098	$263 > 35\%$ and $098 > 25\%$ and $(263 + 098) > 70\%$
w redcedar-hemlock	41	242, 263	$242 > 25\%$ and $(263 + 242) > 70\%$ and $108 < 10\%$
AK cedar-hemlock	49	042, 263	$042 > 25\%$ and $(263 + 042) > 60\%$ and $108 < 10\%$
Sitka spruce	42	098	$098 > 50\%$
mountain hemlock	44	264	$264 > 40\%$ and $108 < 5\%$
lodgepole pine	46	108	$108 > 50\%$
mixed conifer	45	Any Softwoods	$(011^2 + 019^2 + 098 + 108 + 042 + 242 + 263 + 264) > 75\%$
exceptions <sup>1</sup>			$25\% \leq \text{hardwoods} < 50\%$

<u>Forest Type</u>	<u>LCT</u>	<u>Major species</u>	<u>Definition</u>
--------------------	------------	----------------------	-------------------

## Hardwoods

poplar-birch	82	747, 375	$747 > 25$ and $375 > 25$ and $(747 + 375) > 70\%$
red alder	81	351	$351 > 50\%$
paper birch	92	375	$375 > 50\%$
poplar	93	747	$747 > 50\%$
mixed hardwoods	88	Any Hardwoods	$(310^2 + 351 + 375 + 660^2 + 746 + 747 + 920^2) > 75\%$

exceptions<sup>1</sup>  $25\% \leq \text{softwoods} < 50\%$

<sup>1</sup> when no forest type can be assigned using the listed definitions, assign forest type based on stocking excluding softwoods/hardwoods (i.e., adjust stocking percents as if softwoods or hardwoods - whichever has lower stocking - are not present, then assign forest type starting from the top of the list.). Be sure to indicate this condition in polygon notes.

<sup>2</sup> tree species: 011, 019, 310, 660 and 920 cannot be used as site trees for the land cover types they fall in.

The preceding table is used to determine the LCT of a forest polygon. To assign forest type, first decide if the polygon is hardwood (greater than 50% hw stocking) or softwood (greater than 50% sw stocking). Using the appropriate list of types (softwood or hardwood), test the definitions *in the order given* and assign forest type based on the first successful test. Definitions are based on percent of total limited stocking in each species group. Total limited stocking is stocking for the polygon, accumulated for the “biggest and best” trees first, to the “overstocked” limit (167).

#### **FIELD 4-4 Forest Density (FD)**

Record the percent of ground area covered (overtopped) by tree crowns using the density classes listed below. Forest density is a polygon level variable and the density of the entire polygon (at least .4 ha, 1 acre), not just immediately around the plot, must be considered. This variable should remain constant throughout the polygon.

CODE	DESCRIPTION	CODE	DESCRIPTION
0	0 -09%	5	50-59%
1	10-19%	6	60-69%
2	20-29%	7	70-79%
3	30-39%	8	80-89%
4	40-49%	9	0-100%



## **FIELD 4-5 Forest Stand Size (FSS)**

Record a stand size code at each point based on the plurality of percent stocking contributed by growing stock trees within the polygon. Consider tree diameters, crown class and percent stocking over the entire polygon area when determining forest stand size class.

### **CODE DESCRIPTION**

- |   |   |
|---|---|
| 1 | seedling/sapling, <12.5 cm DBH                                |
| 2 | poletimber, $\geq 12.5$ cm DBH and <sawtimber size            |
| 3 | sawtimber, softwood: $\geq 22.5$ cm; hardwood: $\geq 27.5$ cm |
| 5 | nonstocked forest land  |

## **FIELD 4-6 Forest Stand Origin (FSO)**

Record Forest Stand Origin for the polygon area ( $\geq .4$  ha) based on evidence that the forest stand has or has not been artificially regenerated or manipulated. Examples of artificially regenerated stands would be stands where trees are in rows or obvious site preparation has taken place. Manipulated stands include partial cuttings, precommercial thinning of immature stands, and timber stand improvement. If there is any doubt as to the origin of the present stand then record it as natural.

### **CODE DESCRIPTION**

- |   |  |
|---|--|
| 1 | naturally regenerated forest stand                     |
| 2 | artificially regenerated (planted, seeded, site prep.) |
| 3 | manipulated natural stand (thinning, TSI, etc.)        |
| 4 | manipulated artificially regenerated stand             |

## FIELD 4-7    Main Vegetation Type (MVT)

MVT is the vegetation type for the portion of the polygon sampled at the point. If the area around the point is in an inclusion ( $<.4$  ha,  $\geq.2$  ha), the MVT of the bordering vegetation type,  $\geq.4$  hectares (1 acre), that is nearest in characteristics to the surrounding polygon is recorded.

Determine the vegetation type by using the abbreviated key shown on the following pages and Appendix A and B at the end of the manual. Vegetation type is based on an analysis of a combination of species cover and stature (trees have higher stature over shrubs, shrubs higher stature over forbs), i.e., a certain percent cover of a higher stature species is given more weight than the same amount of cover in a lower stature species. From the key below determine the vegetation type to the third level.

Use the Quick reference in Appendix A to expand the level 3 call to the forth level. The level 5 call can then be determined by finding the level 4 call in Appendix B and picking the appropriate community type (level 5) associated with it. Record the level 5 call as a 6 digit code in the Husky under MVT.

**Note**: Only levels 1-4 are directly linked to the polygon type. It is possible for the level 5 portion of the MVT to change from point to point within the same polygon.

MVT should closely match the polygon type as described above. The exceptions would include clearcuts, burns, and other disturbed sites. **Always code clearcuts at level 5 with code 98, Clearcut / disturbed site.**

# Primary Characteristics of the First Three Levels of the Classification of Alaska Vegetation

TREES > 3 M. IN HEIGHT WITH A  
CANOPY COVER OF  $\geq 10\%$

## FOREST 1

### 1 - FOREST

**Needleleaf trees** contribute > 75%  
of tree cover

NEEDLELEAF FOREST 1A

- Needleleaf forest w/ 60-100% tree cover

CLOSED NEEDLELEAF FOREST 1A1

- Needleleaf forest w/ 25-59% tree cover

OPEN NEEDLELEAF FOREST 1A2

- Needleleaf forest w/ 10-24% tree cover

NEEDLELEAF WOODLAND 1A3

**Broadleaf trees** contribute > 75%  
of tree cover

BROADLEAF FOREST 1B

- Broadleaf forest w/ 60-100% tree cover

CLOSED BROADLEAF FOREST 1B1

- Broadleaf forest with 25-59% tree cover

OPEN BROADLEAF FOREST 1B2

- Broadleaf forest w/ 10-24% tree cover

BROADLEAF WOODLAND 1B3

Both **broadleaf & needleleaf** trees  
contribute 25 to 75% of total tree cover....

MIXED FOREST 1C

- Mixed forest with 60-100% tree cover

CLOSED MIXED FOREST 1C1

- Mixed forest with 25-59% tree cover

OPEN MIXED FOREST 1C2

- Mixed forest with 10-24% tree cover

MIXED WOODLAND 1C3

VEGETATION WITH  $\geq 25\%$  COVER OF ERECT  
TO DECUMBENT SHRUBS OR WITH  $\geq 10\%$  COVER  
OF DWARF TREES ( $\leq 3$  M. TALL AT MATURITY) **SCRUB 2**

## **2 - SCRUB**

**Dwarf trees** contribute  $\geq 10\%$  of veg. DWARF TREE SCRUB 2A  
Cover

- Dwarf tree scrub with 60-100%  
tree cover CLOSED DWARF TREE SCRUB 2A1

- Dwarf tree scrub with 25-59%  
tree cover OPEN DWARF TREE SCRUB 2A2

- Dwarf tree scrub with 10-24%  
tree cover DWARF TREE SCRUB WOODLAND  
2A3

**All other scrub types listed below have  $< 10\%$  tree canopy cover**

**Shrubs  $> 1.5$  m tall** with canopy cover  
 $\geq 25\%$  TALL SCRUB 2B

- Shrubs  $> 1.5$  m tall with canopy cover  
 $> 75\%$  CLOSED TALL SCRUB 2B1

- Shrubs  $> 1.5$  m tall with canopy cover  
of 25-75% OPEN TALL SCRUB 2B2

**Shrub  $\leq 1.5$  m and  $\geq 0.2$  m tall,**  
canopy cover  $\geq 25\%$  LOW SCRUB 2C

- Shrubs  $\leq 1.5$  m and  $\geq 0.2$  m tall,  
cover  $> 75\%$  CLOSED LOW SCRUB 2C1

- Shrubs  $\leq 1.5$  m tall, cover of  
2-75% OPEN LOW SCRUB 2C2

**Shrubs  $< 0.2$  m tall** DWARF SCRUB 2D

- Dryas spp. Dominant in the dwarf shrub layer

DWARF SCRUB 2D1

- Ericaceous dominant in the dwarf shrub layer

ERICACEOUS DWARF SCRUB 2D2

- Willow spp. Dominant in the dwarf scrub layer

WILLOW DWARF SCRUB 2D3

HERBACEOUS VEG. WITH < 25%  
SHRUB COVER AND < 10% TREE COVER

**HERBACEOUS 3**

### **3 - HERBACEOUS**

Terrestrial vegetation or if growing in the water then dominated by emergent vegetation with **grasses, sedges or rushes dominant**

GRAMINOID HERBACEOUS 3A

- Grasslands of well drained, dry sites, e.g., south facing bluffs, old beaches, and dunes. Typically (not always) dominated by Elymus spp., Festuca spp., and Deschampsia spp

DRY GRAMINOID HERBACEOUS 3A1

- Moist sites, (usually not with standing water). Dominated by Calamagrostis spp., Carex spp. or Eriophorum spp.; tussocks often present

MESIC GRAMINOID HERBACEOUS  
3A2

- On wet sites, standing water present for part of the year, dominated by either sedges or grasses—includes wet tundra, bogs, marshes and fens

WET GRAMINOID HERBACEOUS 3A3

Terrestrial veg. or if growing in the water then dominated by emergent vegetation **with forbs(broadleaf herbs dominant)**

FORB HERBACEOUS 3B

- Dry site, rocky & well drained,

mostly tundra	DRY FORB HERBACEOUS 3B1
- Moist sites, no standing water, within forest	MESIC FORB HERBACEOUS 3B2
- On wet sites, with standing water part year	WET FORB HERBACEOUS 3B3
Terrestrial vegetation or if growing in the water dominated by emergent vegetation, <b>mosses or lichens dominant</b>	BRYOID HERBACEOUS 3C
- Vegetation cover dominated by mosses	BRYOID MOSS 3C1
- Vegetation cover dominated by lichens	BRYOID LICHEN 3C2
Dominant vegetation growing <b>submerged</b> in water <b>or floating</b> on the water surface, but not emerging above the water	AQUATIC HERBACEOUS 3D
- Veg submerged or floating in fresh water	FRESHWATER AQUATIC 3D1
- Veg submerged or floating in brackish water	BRACKISH WATER AQUATIC 3D2
- Vegetation submerged or floating in salt water	MARINE AQUATIC 3D3

**Use the appendix quick reference and level five list to expand these level three calls to the fourth and fifth levels. Record the 6 digit level five MVT code in the Husky.**

## **FIELD 4-8    Percent Area (PA)**

Percent Area indicates the portion of the 7.3 m plot occupied by a given polygon. When a sample point is entirely in one polygon type record 100% under the PA variable on the Husky. On sample points where more than one polygon type exists, each polygon type will be mapped on the point diagram and its percent area calculated.

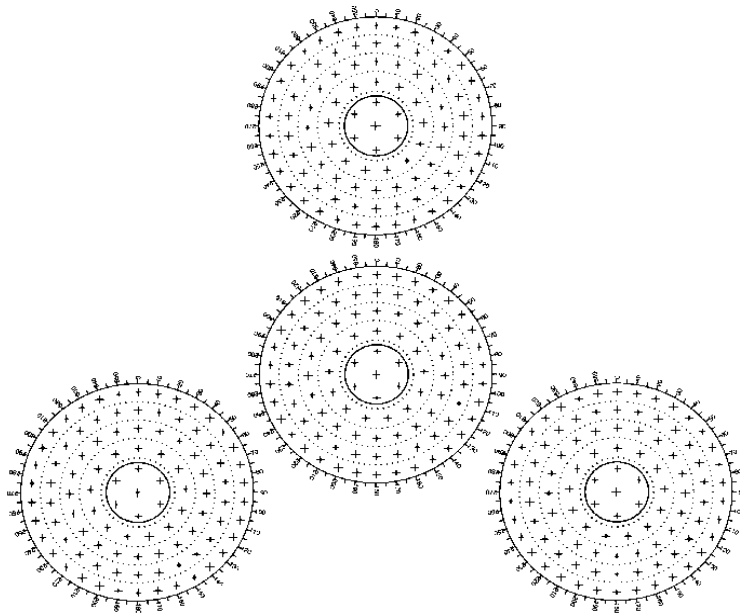
### **Mapping polygons at point level**

Where a sample point has more than one polygon type the polygon type will be drawn on the 7.3 meter radius point diagram. The polygon type will be mapped so that it can be replicated by check cruiser or a remeasurement crew.

The point diagram is designed to aid in mapping and area determination. Each dot represents a 1% area of the plot. To help with mapping, the plot circle is divided up into concentric circles with azimuth to the nearest 5 degrees on the outer edge of the circle.

Measure the azimuth from the point center to points along the polygon type boundary where it intersects the 7.3 m fixed radius circle or makes a directional change. Plot these measurements on the point diagram. If more than one polygon boundary is present, record azimuth and distance to both boundaries and label each polygon with it's respective polygon number. Fill in the rest of the polygon boundary on the point diagram taking as many measurements as is needed to plot the line.

Count the number of dots in each mapped polygon type and record the number. Each dot on the diagram represents 1% of the 7.3 meter fixed radius plot area so a polygon containing 22 dots covers 22% of the area of the plot.



## FIELD 4-9    Stocking Condition (SC)

Stocking condition describes tree cover for the portion of the polygon on the sample point. The purpose is to describe the stocking condition and potential for the polygon. Nonstocked inclusions within a forested type will be coded 51 – 80.

Stocking is based on the full 7.3 m plot area. In cases where more than one polygon type exists on the 7.3 m plot, stocking for a polygon should be estimated as if the entire 7.3 m plot were located in the polygon being estimated.

**Note:** Stocking Condition does not affect polygon type but generally remains constant throughout the polygon. It can change if there is a distinct change from point to point.

CODE DESCRIPTION



- 45 fully stocked, six established trees, growth not inhibited by water.
- 49 fully stocked bog/muskeg, at least 6 seedlings but water inhibits growth.
- 51 inhibiting high brush, > 1.2 meters tall when mature.
- 52 inhibiting low brush, <= 1.2 meters tall when mature.
- 53 inhibiting sod
- 54 inhibiting duff
- 55 inhibiting slash and debris
- 56 inhibiting moss
- 60 stockable, > 1/2 seedling plot clear to permit establishment and development of 1 or more seedlings, not overtopped by tree crowns.
- 70 nonstocked overtopped
- 80 nonstockable, > 1/2 fixed radius seedling plot is rock, water, etc.

#### **FIELD 4-10 Soils F-Series (SFS)**

Record Soils F-series on all forested polygon types using the following key.

F-series should be determined at a representative site, close to the sample point and within the polygon being described. **Note:** Soils F-series generally will remain consistent throughout the polygon but can change if there is a distinct change from point to point.

### **Key to mature forest ecosystem soil classes**

- |   |         |
|---|---------|
| 1. Organic soil   | Go to 2 |
| 1. Mineral soil   | Go to 4 |
| 2. Poorly drained   | Go to 3 |
| 2. Freely drained, essentially duff over bedrock (Tongass and Chugach) (F2r)  | M7      |
| 3. Sea level to 1,500 feet elevation; 3" to >12" of duff over black muck or mucky peat. Water table often within 12" of base of duff layer. (Tongass except Yakutat) (F5) | M8      |
| 3. Above 1,500 feet elevation; black, stony muck; no duff layer (Tongass and Chugach) (F7)  | M9      |
| 4. Deep mineral soil (>10" deep)  | Go to 5 |
| 4. Shallow mineral soil (2" - 10" deep)   | Go to 7 |
| 5. Well drained   | Go to 6 |
| 5. Somewhat poorly drained; water table at about 2 feet; Devil's club (and/or skunk cabbage) often present. (Tongass except Yakutat, and Chugach) (F4)                    | M4      |
| 6. Bright colors indicating good drainage; water table below 2 feet deep. (Tongass except Yakutat, and Chugach) (F1)  | M1      |
| 6. Dull colors but well drained; deep mineral soil of cobblestone, gravel, and coarse sand. (Tongass except Yakutat) (F3)   | M3      |
| 7. Poorly drained, dull colors; shallow to bedrock (Tongass except Yakutat) (F6)  | M5      |
| 7. Well drained   | Go to 8 |
| 8. Shallow to substrata; no water table; sea level to 1,500 feet elevation. (Tongass and Chugach) (F2)  | M2      |
| 8. High elevation (above 1,500 feet) (Chugach) (F8)   | M6      |

### **Key to immature forest ecosystem soil classes**

**{Primarily for use in Yakutat and Yakataga areas or areas of obviously new soils development (glacial, beach, outwash, stream deposits)}**

- |   |         |
|---|---------|
| 1. Beach soils (including uplift in the Yakutat area) | Go to 2 |
| 1. Non-beach soil                                     | Go to 3 |
| 2. Beach soil with strong profile (f1B)               | I2      |
| 2. Beach soil with weak or no profile (f1b)           | I2      |

3. Morainal soils, not alluvial or outwash	Go to 4
3. Non-morainal soils, alluvial or outwash	Go to 5
4. Many small lakes present on moraines (f3L)	I4
4. Broken, short, steep sloped moraine soils ( <u>f3</u> )	I4
4. Moraine soils on level or rolling terrain with few or no lakes (f3)	I4
5. Outwash soils showing no flood deposits, coarse soil	Go to 6
5. Alluvial soils, showing flood deposits, fines present	Go to 7
6. Surface water present, scrub trees present (f5)	I6
6. Well drained-organic duff present, but going directly to undeveloped outwash material below (f3g)	I4
7. Young, moderately or poorly drained alluvial soils	Go to 8
7. Freely drained young or old alluvial soils	Go to 9
8. Heavy gray alluvial loam or brown alluvial sandy loam deposits with no sand, gravel, or cobbles in upper 12"-18", water at 10" (f4f)	I5
8. Poorly profiled moderately drained alluvial soil, water table at 6"-8" depth (f3t2)	I4
9. Alluvial soils on outwash next to old, dead streambed, 4"-6" deep loam soils (f3n)	I3
9. Alluvial soils on outwash, strong profile (f3t)	I3
9. Alluvial, > 10" deep mineral soil, poorly defined horizons, dull colored. (f1)	I1

Expanded descriptions of mature ecosystem soils. Extracted from:  
**Soils and associated ecosystems of the Tongass.** F. R. Stephens, C.  
R. Gass, R. F. Billings, and D. E. Paulson. USDA Forest Service,  
Alaska Region. Draft 1969

M1 (F1)--Freely-drained soils at least 10" deep

This extensive ecosystem type is on well- and moderately well-drained soils with at least 10 inches of mineral soil over bedrock. They occur from sea level to about 1,500 feet elevation. The soils vary widely in parent material and from sandy loam to silt loam in texture, with 0 to 75 percent coarse fragments by volume. They have three inches to a foot or more of surface organic matter (duff), a trace to 4 inches of gray A2, 1 to 3 inches of black or very dark reddish brown B21, and 6 inches to several feet of splotchy reddish brown to brown B3 horizons. These soils rarely dry to field capacity or saturate to the point of surface runoff. Moisture is almost always moving through their sola.

M2 (F2)--Freely-drained soils 2" - 10" deep

This extensive type is on well-drained, shallow to bedrock soils that occur from sea level up to about 1,500 feet elevation. The soils have 3 inches to more than a foot of duff. Soil profiles are similar to soils of ecosystem F1, except they are truncated by bedrock.

M7 (F2r)--Freely-drained soils < 2" to bedrock

These ecosystem soils are essentially just a duff layer over bedrock. They tend to become drier than other soils.

M3 (F3)--Deep, freely-drained soils

This ecosystem type is on deep, freely-drained soils that are similar in gross morphology to those of type F1, but have somewhat lower productivity. They are developed on deep deposits that were coarse textured at “time zero,” such as deep, coarse-textured moraines or ash or pumice deposits. At present, however, most of the soils are high in colloids.

#### M4 (F4)--Somewhat poorly-drained soils

This extensive ecosystem type is on somewhat poorly-drained soils that occur from sea level up to around 1,500 feet elevation.

They vary widely in parent material, although all overlie some drainage restriction. Textures range from sandy loam to silt loam with up to 75 percent coarse fragments by volume. They have a three inches to a foot or more of duff, a trace to six inches of dark gray A2 horizon, one to six inches of black B21 and up to a foot or two of dark grayish brown B3 horizon. These soils usually have a seeping water table within 18 inches of the duff.

#### M8 (F5)--Poorly-drained soils

This ecosystem type is very extensive in southeast Alaska. The soils are organic and occur from sea level up to about 1,500 feet elevation. They have three inches to a foot or more of duff over a layer of black muck or mucky peat, which in turn usually overlies a layer of sedge or sphagnum peat. Beneath the organic soil material is compact till, massive bedrock, fine textured lake or marine sediments, volcanic ash with well-developed iron pans, or some other very slowly permeable deposit. These soils usually have a water table within a foot of the base of the duff layer. Rooting is largely restricted to the duff.

#### M5 (F6)--Somewhat poorly-drained soils of the high elevation, poor timber zone

These are the extensive ecosystems that occur just under the alpine zone between about 1,500 and 2,000 feet elevation. The soils are mostly shallow to bedrock. Slopes are gentle to very steep and rock outcrops are common.

M9 (F7)--Poorly-drained organic soils of the high elevation, poor timber zone

These ecosystems occur in the same climactic zone as ecosystem F6 and have similar vegetation. However, the soils are black, stony mucks. In addition, they are the only mature forest ecosystem soils that lack duff layers.

M6 (F8)

No documentation available

Quick reference for F-series forest-ecosystems soil classes

M1 (F1) mineral >10", well drained, bright; site index-130

M2 (F2) mineral <10", well drained; site index-100

M3 (F3) mineral >10", well drained, dull; site index-110

M4 (F4) mineral >10", poor drainage; site index-100

M5 (F6) mineral <10", poor drainage; site index-100

M6 (F8) mineral, well drained, high elev.; site index-100

M7 (F2r) organic, drained, duff on bedrock; site index-80

M8 (F5) organic, duff on peat or muck; site index-70

M9 (F7) organic, muck, no duff, high elev.; site index-70

I1 (f1) alluvial >10" mineral, poor horizon; site index-130

I2 (f1b, f1B) beach soils; site index-110

I3 (f3n, f3t) alluvial, 4-6" loam well drained; site index-100

I4 (f3, f3, f3L, f3g, f3t2) moraines/undeveloped <10" alluvial; site index-90

I5 (f4f) alluvial loam, >6" poor drainage; site index-80

I6 (f5) outwash, surface water present; site index-50

## FIELD 4-11 Canopy Structure Class (CSC)

Record the code that best describes the structure of the forest canopy of the polygon. **Note:** Canopy Structure should remain consistent throughout the polygon but can change (without affecting polygon type) if there is a distinct change from point to point.

CODE	DESCRIPTION
1	<u>single storied</u> : predominantly even canopy with majority of tree crowns in the same height class
2	<u>two storied</u> : two canopy levels in stand, both canopy levels are uniformly distributed throughout the stand but not necessarily contiguous or closed
3	<u>multi-storied</u> : at least three size classes represented in the stand; canopy generally broken and uneven; various size classes uniformly distributed throughout the stand
4	<u>mosaic</u> : at least two distinct size classes represented but are not uniformly distributed and are usually grouped in small aggregations or narrow stringers; aggregations may not be even-aged
5	<u>nonstocked forest land</u>
6	<u>woodland (stocked)</u> : greater than 10% cover but less than 25% cover.



## FIELD 4-12 Polygon Record Notes

Record notes up to 70 characters long regarding the given polygon. If more than 70 characters are needed, refer to a note on paper (on the Location Record form, etc.). Use the Polygon Notes to give information on the following:

- Inaccessible point/estimated LCT/MVT. Record: **LCT=XX MVT=XXXXXX** where X's are valid codes
- No tally on the Tree Record for forested polygons. Record: **NO TREES**
- Non-productive forest types. Record: **NONPROD**
- Add note **STOCKED** when polygon meets the stocked requirements but less than 6 trees are tallied. Commonly used on mapped points.
- Note if the polygon is a Clearcut and a description
- Problems with obtaining site, age, or radial growth trees
- Note on krummholz stands being treated as shrubland
- Any abnormalities about the polygon

Access Notes from the Husky Polygon Record by pressing the F4 function key. Enter the note and press the YES (Return/Enter) or F4 key to save note. Press ESC to exit notes without saving the entry.

## SECTION 5 TREE RECORD

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## INTRODUCTION

Before recording tree data for a given point the respective Point and Polygon records for that point must be completed. This is required because several fields in the Tree record, such as Site and Age Trees, depend upon the data in the other records.

### Large Fixed Radius Tree Plot

Trees are selected if the horizontal distance from the point center to the center of the tree at DBH is less than the radius for the plot

Since all polygon types that occur on the fixed radius plots are mapped, all tally trees within the large fixed radius plot will be measured regardless of the polygon type they fall in.

The following are trees measured on the large fixed (7.3m) radius plot:

- *Live* Trees  $\geq 12.5$  cm DBH
- Standing Dead Trees (*snags*)  $\geq 12.5$  cm DBH,  $\geq 1.37$  m tall
- Down Dead Trees (*logs*)  $\geq 12.5$  cm DBH and greater than 50% sound (cut trees left on the ground should be tallied as logs)

Identify tally trees starting at north and, moving in a clockwise direction, number them as they are tallied.

On each tree place an aluminum nail just below the DBH point to indicate where diameter measurements were taken.

### Small Fixed Radius Seedling/Sapling Plot

After the large fixed-radius plot tally is complete, live seedlings ( $< 2.5$  cm. DBH) and live standing saplings ( $\geq 2.5$  cm. DBH and  $< 12.5$  cm. DBH) are tallied on a 2-meter radius plot.

Trees  $< 12.5$  cm. DBH are recorded if the horizontal distance from point center to the center of the tree at breast height is  $\leq 2$  m. In the case of seedlings, the distance to the center of the root collar must be within 2 m.

Seedlings are tallied only if they are **established**, i.e., good coloration, no evidence of disease, and root system in contact with mineral soil. In Coastal Alaska, some exception can be taken for seedlings (those  $\geq 1$  dm., no buttons) that are growing on nurse logs as long as the log is in contact with the ground. Seedlings are seldom classed as rough (TC 30).

Seedlings can be grouped by height class within species where the tree class is the same. One tree record is recorded for each group, including number of seedlings (NS) in the group.

**Note Krummholz stands:** Low Site/ Krummholz stands are stands where the trees are growing in a twisted/stunted shrub-like form and trees will never produce a 4m log. These stands are treated as shrubland. Do not tally trees/saplings/seedlings nor bore for Site or Age any tree species exhibiting a Krummholz growth form. If the polygon has a mix of tree species and one exhibits a Krummholz growth form, the other species are tallied using the standard procedures.

## REQUIRED FIELDS

While recording tree data physical characteristics of the tree will determine which data fields may or may not be required. In the Husky tree record, underscores ( ) are used to indicate required fields.

Alternatively, the following key may be used to determine what fields are required for a particular tree.

All possible fields:

Tr	PN	H	Spc	DBH	Az	Dis	CR	CC	CL	CF
—	—	—	—	—	—	—	—	—	—	—
THt	LSS		SH	PD	PS	SD	SS	DC	DB	TC
—	—	—	—	—	—	—	—	—	—	—
OG	ST	RG	Age	NS	DWT	BT				
—	—	—	—	—	—	—				

H = 1 (Live)

DBH  $\geq$  12.5 cm (poletimber and larger):

Tr	PN	H	Spc	DBH	Az	Dis	CR	CC	CL	CF
—	—	—	—	—	—	—	—	—	—	—
THt	LSS		SH	PD	PS	SD	SS	DC	DB	TC
—	—	—	—	—	—	—	—	—	—	—
OG	ST	RG	Age	NS	DWT	BT				
—	—	—	—	—	—	—				

Exceptions:

Sawtimber tree (needleleaf with dbh  $\geq$  22.5 cm, broadleaf with dbh  $\geq$  27.5 cm): record DB.

Sawtimber trees (see above) record OG.

Growth tree (first tree for the location in a polygon type, within a species and 5 cm diameter class): record RG.

Site tree code  $> 0$  (site and/or age tree): record RG and Age.

DBH  $\geq$  2.5 cm, and DBH  $<$  12.5 cm (saplings):

Tr	PN	H	Spc	DBH	Az	Dis	CR	CC	CL	CF
—	—	—	—	—	—	—	—	—	—	—
THt	LSS		SH	PD	PS	SD	SS	DC	DB	TC
—	—	—	—	—	—	—	—	—	—	—
OG	ST	RG	Age	NS	DWT	BT				
—	—	—	—	—	—	—				

DBH = 0001 (seedlings):

Tr	PN	H	Sp	c	DBH	Az	Dis	CR	CC	CL	CF
—	—	—	—	—	—	—	—	—	—	—	—
THt	LSS		SH		PD	PS	SD	SS	DC	DB	TC
—	—	—	—	—	—	—	—	—	—	—	—
OG	ST	RG	Age		NS	DWT	BT				
					—						

H = 4 or 5 (Dead)

DBH  $\geq$  12.5 cm (poletimber and larger):

Tr	PN	H	Sp	c	DBH	Az	Dis	CR	CC	CL	CF
—	—	—	—	—	—	—	—	—	—	—	—
THt	LSS		SH		PD	PS	SD	SS	DC	DB	TC
—	—	—	—	—	—	—	—	—	—	—	—
OG	ST	RG	Age		NS	DWT	BT				
					—		—				

Exceptions:

Sawtimber tree (needleleaf with dbh  $\geq$  22.5 cm, broadleaf with dbh  $\geq$  27.5 cm): record DB.

Sawtimber trees (see above) record OG.

If Snag (standing portion over breast height & not cut) then record LSS (using S for the 1st character) and then record SH (height of actual standing portion of snag).

If down tree (no standing portion over breast height, and DC less than 50), record LSS (using L for the 1st character) DO NOT record SH.

(Dead seedlings, DBH  $<$  2.5 cm, and saplings, 2.5 cm  $\leq$  DBH  $<$  12.5, not recorded)

## POINTS WITH NO TALLY

On points with a forest LCT and no tree tally, go into the Polygon Record and make a notation “NO TREES” in the notes.

## TREE RECORD FIELDS

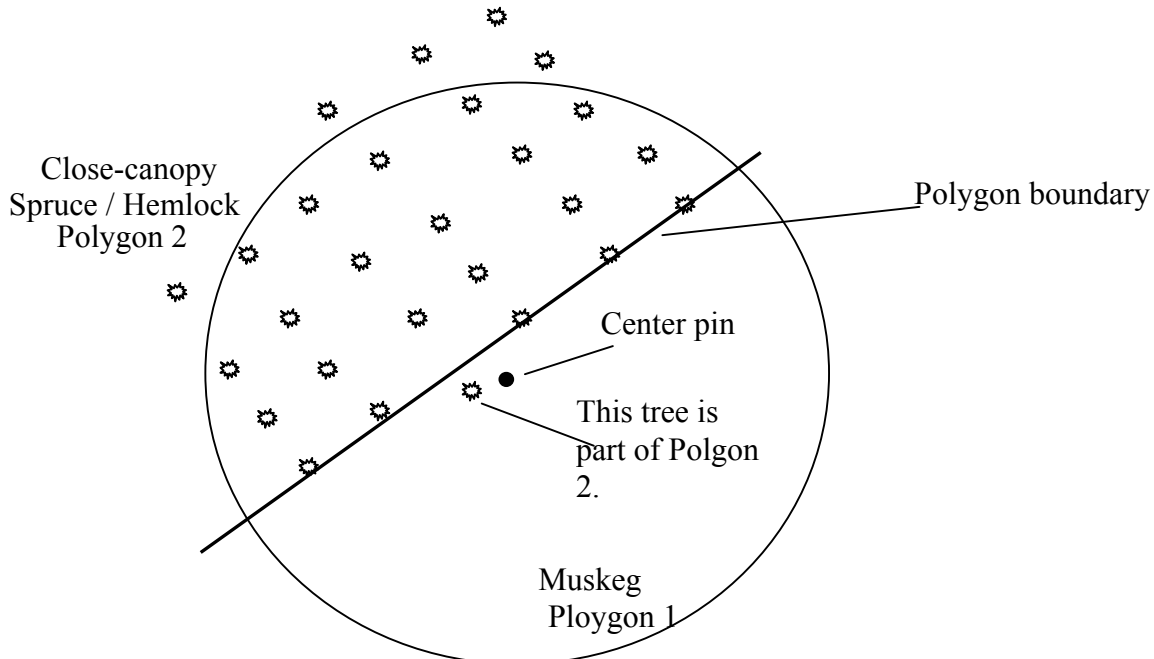
### FIELD 5-1 Tree Number (Tr)

As described in the General Instructions section, select tally trees on the large fixed radius plot first, then record seedlings and saplings on the smaller fixed radius plot. On the Husky, trees will be numbered automatically.

### FIELD 5-2 Polygon Number (PN)

Enter the number of the polygon where the tree is physically rooted. Available polygon types can be picked from a list by pressing the F1 key, scrolling to the appropriate polygon and hitting enter. You may only use polygons numbers that occur on the point.

Often, a referenced boundary is approximate, and trees selected for tally are assigned to the actual condition to which they belong regardless of the recorded approximate boundary



### **FIELD 5-3 History (H)**

Record a tree history code for each tree using the following codes:

CODE	DEFINITION
1	Live trees. Includes seedlings, saplings, poletimber, sawtimber trees, and all site trees.
4	Dead $\leq$ 5 years.
5	Dead $>$ 5 years.

### GUIDE TO ESTIMATING TIME SINCE DEATH

#### Sitka spruce and Western hemlock

Trees dead  $\leq$  five years have:

1. Some needles remaining
2.  $\geq$  25% of branchlets remaining
3. Tight bark (applies particularly to hemlock)
- (30) Few secondary branches falling

Trees dead  $>$  five years have:

1.  $<$  25% of branchlets remaining
2. Secondary and primary branches falling
3. Bark sloughing
4. Sporophores of FOMES PINICOLA and other common fungi

#### Alaska-cedar

Trees dead  $\leq$  five years have:

1. Some needles remaining (if dead  $<$  3 years)
2.  $\geq$  25% of branchlets remaining

Trees dead  $>$  five years have:

1. Secondary and primary branches falling
- (31) Bark cracking or sloughing



## White spruce and black spruce

Trees dead  $\leq$  five years have:

1. Some needles remaining
2.  $\geq 30\%$  of branchlets remaining
3. Little sloughing of bark
4.  $\geq 50\%$  of branches remain

Trees dead  $>$  five years have:

1. No needles
2.  $< 30\%$  of branchlets remain
3. Considerable bark sloughing
4.  $< 50\%$  of branches remain
5. Large limbs falling

## Birch

Trees dead  $\leq$  five years have:

1. A few persistent leaves remaining
2.  $\geq 50\%$  of branchlets remaining
3. Bark curling abnormally
4. Occasional secondary branch falling

Trees dead  $>$  five years have:

1. No foliage
2.  $< 50\%$  of secondary branches remaining
3. Bark shows abnormal curling

## Other hardwoods

Trees dead  $\leq$  five years have:

1.  $\geq 50\%$  of the bark still attached in some degree to the bole.  
May or may not have foliage remaining.

Trees dead  $>$  five years have:

1. No foliage remaining
2. Bark has fallen completely free of bole, or less than 50% remains attached in any degree.

## FIELD 5-4 Species (Spc)

Record the appropriate species code.

CODE SPECIES

### Softwoods

11	Pacific silver fir
19	subalpine fir
42	Alaska yellow cedar
71	tamaraack
94	white spruce
95	black spruce
98	Sitka spruce
108	lodgepole pine
231	Pacific yew
242	western redcedar
263	western hemlock
264	mtn. hemloc

CODE SPECIES

### Hardwoods

310	maple sp. (tree form only)
351	red alder
375	paper birch
660	apple
746	quaking aspen
747	black cottonwood
920	willow sp. (tree form only)

**Willow and maple** : Only tally willow and maple species when they have achieved and appear to maintain an “upright tree growth form”.

## FIELD 5-5 Diameter at Breast Height, mm (DBH)

Tree diameter to nearest mm at 1.37 meters from ground level, measured along the bole. Record DBH for seedlings (trees < 2.5 cm. DBH) as 0001. See Appendix L for a detailed description of measuring DBH.

## FIELD 5-6 Azimuth (Az)

Enter trees into the Husky starting from north and proceeding clockwise. Azimuth is measured from the point to the center of the tree at breast height for trees  $\geq 12.5$  cm. DBH. Record magnetic north as  $360^\circ$ . On the Husky, a new tree may be inserted at any point in the sequence using Insert from the F2 menu.

## FIELD 5-7 Distance, dm (Dis)

Record horizontal (level) distance in **decimeters** from the point center to the center of the tree at the DBH level. For tally trees, the maximum distance from the point to the center of the tree at DBH will not exceed the radius of the fixed plot (7.3 m). The distance to non-tally site trees should be estimated if over 25 meters.

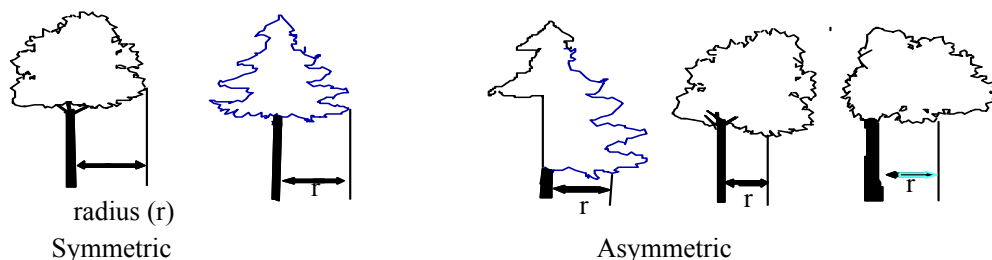
See General Instruction section for a detailed description of measuring distance, including slope correction.

### Horizontal distance to the tree

Distance in decimeters is measured from point center to the center of the tree at the DBH point. Be sure to measure to the correct DBH point for trees that are leaning, down, forked, and other special cases described above. Distance must be obtained using a level or slope corrected tape (see SLOPE CORRECTION below).

## FIELD 5-8 Crown Radius, dm (CR)

Estimate average radius from the center of the bole to the widest portion of the crown and record to the nearest decimeter for all live trees  $\geq 2.5$  cm.



## **FIELD 5-9     Crown Class (CC)**

### **CODE   DEFINITION**

#### **Mature Forest Stands:**

- 1     Open Grown: Trees with crowns which have received light from above and all sides throughout most of their lives. Their forms or crown shapes have not been and are not likely to be influenced by other trees. This category includes many trees growing in muskegs and shrub covered slopes
- 2     Dominant: Trees with crowns extending above the general level of the crown canopy and receiving full light from above and partly from the side; larger than the average trees in the stand, and with crowns dense, comparatively wide and long, but possibly somewhat crowded on the sides.
- 3     Codominant: Trees with crowns forming the general level of the crown canopy and receiving full light from above but comparatively little from the sides; usually with medium-size crowns more or less crowded on the sides.
- 4     Intermediate: Trees shorter than dominants or codominants, with crowns below or barely reaching into the main canopy, receiving little direct light from above and none from the sides, usually with small crowns considerably crowded on the sides.
- 5     Overtopped: Trees with crowns entirely below the general level of the crown canopy, receiving no direct light from above or from the sides. Use this code for small trees and regeneration under the forest canopy. All trees that fall in this category that are suppressed and would not respond to release, also code suppression (2702) under Primary Damage (PD).

Crown class is essentially a classification of competition for light and is aimed at separating trees that have grown free of competing

vegetation from those that have not. It designates trees with crowns of similar development and occupying similar positions in the crown canopy. Differentiation into crown classes is intended for application in even-aged stands and within small even-aged groups in which trees of an uneven-aged stand are often arranged.

In uneven-aged stands of tolerant species (in which the trees are not in small even-aged groups), trees in the intermediate crown position in the stand and with medium-sized crowns will be considered comparable to codominants of even-aged stands and coded as such. An example of this would be young white spruce in an aspen or birch stand.

As a general rule, in multi-story stands, crown class for each tree must be judged in the context of its immediate environment, that is, those trees and other vegetation (particularly shrub species) affecting it or being affected by it in terms of competition for light. In cases where the overstory consists of scattered veterans standing above larger numbers of younger trees, a considerable portion of the understory trees will undoubtedly be classified as dominant or codominant.

**Clear-cut exception:** Residual trees left in a clear-cut unit should be given crown class ratings based on **pre-harvest conditions**. The purpose is to separate non-harvested trees into those that were originally suppressed and those that were not. This exception only applies to residual trees. Any post-harvest regeneration (planted or natural) should be given crown classes based on current conditions.

### **FIELD 5-10 Crown Length, percent of total height (CL)**

Crown length is a percent of actual tree height.

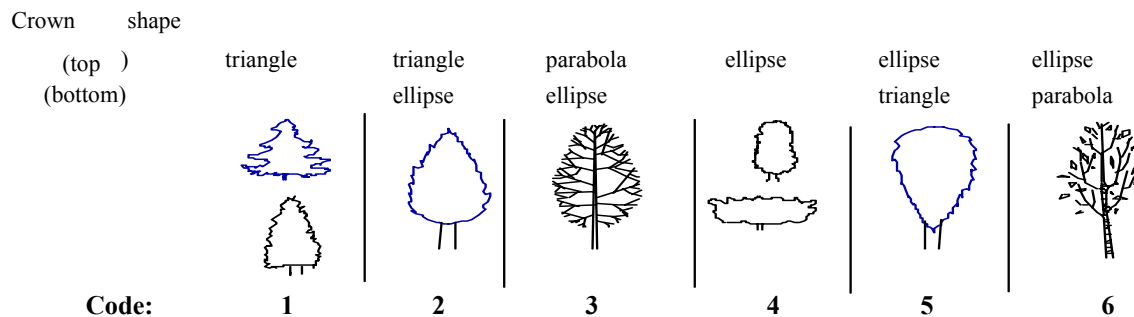
CODE	%Crown	CODE	%Crown	CODE	%Crown
1	0 - 19	4	40 - 49	7	70 - 79
2	20 - 29	5	50 - 59	8	80 - 89
3	30 - 39	6	60 - 69	9	90 -100

Crown length is related to vigor and growth of a tree. Crown length is that portion of the existing tree bole that supports green, live, healthy foliage and is effectively contributing to tree growth. Large gaps in

the crown should not be included in the length of the crown. Note for trees with broken tops or other crown damage, crown length is determined as a percentage of currently existing bole. Do not use total height as estimated.

## FIELD 5-11 CROWN FORM (CF)

Enter the crown form code for the shape that best approximates the shape of the tree's crown. Note for trees with broken tops or other crown damage, crown form is based on its current form, do not reconstruct the crown shape. Shapes and codes are as follows:



## FIELD 5-12 Total Height, dm (THt)

Measure total height to the nearest decimeter on all tally trees, and site/age trees.

### Forked Trees:

On trees that fork above DBH, measure length along the longest section. Forks that have departure angles  $> 45^\circ$  (from the bole) are considered limbs.

### Broken top & replaced broken top:

Heights of live trees with broken tops should include an estimate of the missing portion of the tree (i.e. projected height). Estimates of total height can be gauged by comparing nearby undamaged trees of

the same species and diameter class. Include a note in the tree record indicating the actual height of the tree (example Broken @ 12.4m).

If the broken portion has been "replaced" with a new top total height is measured to the new top. A new leader is considered to have "replaced" the original broken top when it has achieved approximately  $1/3^{\text{rd}}$  the diameter of the original main stem at the point of breakage.

Note, if a new top has "replaced" the original broken top, do not damage tree for a broken top (2808), instead damage for crook/sweep/taper (2802). Do consider existing rot and decay resulting from the broken top when determining cubic and board-foot defect. Explain any irregularities in the notes for the individual tree on the HUSKY.

#### Snags:

Heights of dead snags with broken tops should include an estimate of the missing portion of the tree (i.e. projected height). Estimates of total height can be gauged by comparing nearby undamaged snags or trees of the same species and diameter class. The actual height (height to the break) is recorded under the variable Snag Height.



## FIELD 5-13 Log/Snag Stage (LSS)

Log and Snag Stage is a two character code used to describe the state of deterioration of a tree bole after death. The first character indicates whether the tree is a snag (standing portion  $\geq 1.37$  meters & not cut i.e. no cut stumps of any height) or a log (standing portion  $< 1.37$  meters, can be cut but not utilized). The second character is used to indicate the condition of the actual bole.

First Character:

CODE	DEFINITION
------	------------

- |   |  |
|---|--|
| S | Snag, tree intact, $\geq 1.37$ meters in height  |
| L | Log, broken off, $< 1.37$ meters, $> 50\%$ sound |

Second Character:

CODE	DESCRIPTION
------	-------------

- |   |  |
|---|--|
| 1 | bark tight and intact; branches and twigs present; cross section retains original shape; bole is ridged.   |
| 2 | $\leq 50\%$ of bark loose/missing; primary branches missing; cross-section original shape; if down bole may sag unless supported.  |
| 3 | up to 75% bark missing or decayed; primary and secondary branches missing or broken; cross-section may be distorted from original shape; if down, bole is sagging or fully supported by ground.  |
| 4 | more than 75% bark missing or decayed; most primary branches absent or broken; cross-section, partially eroded and top may be broken; if down, bole is sagging or fully supported by the ground. |

- 5 bark and all limbs absent or decayed; cross-section severely distorted or eroded from original shape; top possibly broken; if down, fully supported by the ground or merging with the soil layer (must be >50% sound).

**FIELD 5-14 Snag Height, dm (SH)**

Actual height of standing portion of dead tree. Must be  $\geq 1.37$  meters (breast height). Snag height must  $\leq$  the total height of the tree.

**FIELD 5-15 Primary Damage/Cause of Death (PD)**

PD is current primary damage for live trees or cause of death for dead trees (use PD=5000 for unknown cause of death). PD indicates a reduction in quality, health, vigor, or productivity of a live tree. SD is secondary damage for live or dead trees. The damage with the greatest impact to survivability should be recorded under Primary Damage.

Primary and Secondary Damage/Cause of Death influence Tree Class, and so must not be coded carelessly. Desirable trees (TC = 10) must have Primary Damage 00 (none). Certain damage and severity code combinations will cause a tree to be coded as rough (TC=30) or rotten (TC=40) and thus eliminate the tree from growing stock. These damage codes are delineated on the damage code list below.

Damage codes are divided into groups (1000's, 3000's etc.) of similar damage agents. For each damage code recorded, a severity rating for that damage will also be required. Certain severity codes will cause a tree to be coded TC 21 or greater (see severity section).

Descriptions of each code include the following **notes**, where applicable:

- (^) damage code usually not used for cause of death. Live PD or SD only, or SD for dead tree.
- (R) damage code indicates Rot. TC = 40 (rotten) required if DC  $\geq$  50% or DB  $\geq$  70% (if TC=40 Usually coded as PD)
- (30) damage code requires TC=30 (rough) if severity coded as severe. Usually coded as PD

<b>Code Notes</b>	<b>DESCRIPTION</b>
0000	NO SIGNIFICANT DAMAGE DETECTED
1000	GENERAL INSECTS
1001 (^)	Curculionidae weevil
1100	BARK BEETLES not specifically identified
1101	Dendroctonus rufipennis-spruce beetle
1200 (^)	DEFOLIATORS not specifically identified
1201 (^)	Acleris gloverana-western blackheaded budworm
1202 (^)	Choristoneura occidentalis-western spruce budworm
1203 (^)	Neodiprion tsugae-hemlock sawfly
1400 (^)	SUCKING INSECTS not specifically identified
1500 (^)	BORING INSECTS not specifically identified
2000 (R)	GENERAL ROT/DISEASE not specifically identified
2100 (R)	ROOT/BUTT DISEASE not specifically identified
2101 (R)	Armillaria spp.
2102 (R)	Fomitopsis pinicola
2103 (R)	Phaeolus schweinitzii
2200 (R)	STEM DECAYS/CANKERS not specifically identified
2201 (R)	Echinodontium tinctorum
2202 (R)	Fomes fomentarius-tinder fungus
2203 (R)	Fomitopsis officinalis-quinine conk
2204 (R)	Ganoderma applanatum-Artist conk
2205 (R)	Laetiporus sulphureus-chicken of the woods
2206 (R)	Phellinus igniarius-false tinder fungus
2207 (R)	Phellinus robustus(hartigii)
2208 (R)	Phellinus pini-red ring rot
2209 (R)	Piptoporus betulinus-birch conk
2210 (R)	Xenomeris abietis-hemlock canker
2300 (^)	PARASITIC/EPIPHYTIC DISEASE not identified
2301 (^)	Arceuthobium tsugense (mistletoe)
2401	Alaska yellow cedar decline complex
2500 (^)	FOLIAGE DISEASE not specifically identified
2501 (^)	Chrysomyxa arctostaphyli-broom rust
2700 (^)	PHYSICAL DEFECT(not prod/fiber def) not id'ed
2701 (30;^)	excessive lean
2702 (30;^)	suppression
2703 (^)	unhealthy foliage
2800 (^)	PRODUCT/FIBER DEFECT not specifically identified
2801 (^)	bark seam
2802 (^)	spike top/dead top

2803 (^)	burl, stem deformity
2804 (^)	crook, sweep,taper
2805 (^)	forking
2806 (^)	hemlock fluting (beyond slab collar)
2807 (^)	heartwood scar/catface
2808 (^)	Broken top
2809 (30;^)	Wolf tree, excessively limby, remnant
2810 (^)	sucker limb bayonet top/limb
3000 (30)	FIRE
4100	ANIMAL DAMAGE not specifically identified
4101	bear
4102	beaver
4103	moose
4104	porcupine
4105	hares/rabbits
4106	deer
4107 (^)	sapsucker
5000	ABIOTIC DAMAGE not ident.(unknown cause of death)
5001 (30)	lack of drainage (bogs, low site, muskegs, etc.)
5002 (30)	knocked down by other tree
5003	periodic flooding/high water-natural estuary
5004 (^)	frost cracks
5005	landslides/mudflows/rockfall
5006	wind-broken bole, roots remain in soil
5007	wind-stand level damage windthrow and windsnap
5008 (30)	wind-patch level root-throw
5009	wind-patch level windsnap, roots remain in soil
5010 (30)	wind-gap level root-throw
5011	WEATHER not specifically identified
5012	lightning
7000	HUMAN ACTIVITIES (other than logging & harvest)
7100	HARVEST EFFECT not specif. attributed to logging
7101	logging damage
7102	logging-basal stem damage
7103	logging-broken top and branches
7104	logging-killed, not felled(cause of death)
7105 (30)	logging-partial uprooting

## FIELD 5-16 Primary Severity (PS)

Primary Severity indicates the level of severity for the recorded Primary Damage. Damage codes are divided into groups (1000, 1100,..., 7100) of similar agents. Each group has unique set of severity codes that are appropriate for the damages in that group. Each group contains codes indicating minor and severe damage. When a severity is coded severe, the Tree Class (TC) must be coded at least TC=21 (deteriorating, see Tree Class section). The following guidelines illustrate the relationship between Severity, Defect, and Tree Class.

<u>Severity</u>	<u>Applies to...</u>	<u>Requires</u>
Minor	All Trees	TC must = 20
Severe	All Trees	TC must be $\geq 21$
Severe	Trees < Sawtimber	TC = 30 if: <ul style="list-style-type: none"><li>◇ PD forces TC = 30 (see PD list)</li><li>◇ PD is not rot (2000-2210) and tree won't produce marketable products now or in the future</li></ul> TC = 40 if: <ul style="list-style-type: none"><li>◇ PD is rot (2000 - 2210) and DC <math>\geq 50\%</math></li></ul>
Severe	Trees $\geq$ Sawtimber	TC = 30 if: <ul style="list-style-type: none"><li>◇ PD forces a TC = 30 (see PD list)</li><li>◇ PD <math>\neq</math> rot (2000 - 2210) and DB <math>\geq 70\%</math></li></ul> TC = 40 if: <ul style="list-style-type: none"><li>◇ PD is rot (2000 - 2210) and DC <math>\geq 50\%</math> or DB <math>\geq 70</math></li></ul>

In the following severity code list, SEVERITY CODES in underlined ITALICS are SEVERE and will force the rules outlined above. Codes in normal text are Minor severity.

Severe = unless otherwise noted, is damage that will probably cause the death of the tree within 10 years or reduce cubic foot or board foot volume  $\geq 25\%$ .

**Minor** = observed damage that does not meet the definition of severe.

## Damage

### Class      Code      Description

0000	0	No Damage or Severity recorded
1000	1	Minor
	<u>2</u>	<i>Severe</i>
1100	1	Pitched out attack this/last year, beetle brood absent
	<u>2</u>	<i>Successful attack this/last year, beetle brood present</i>
	<u>3</u>	<i>Strip attack this/last year, galleries or brood present</i>
	<u>4</u>	<i>Dead or dying tree, last years successful attack</i>
	<u>5</u>	<i>Topkill at any height, usually above midpoint of crown</i>
	<u>6</u>	<i>Dead tree, older beetle kill</i>
1200	1	Defoliation 1-25% of total crown, no topkill
	2	Defol. 1-25% of total crown, topkill 1-10% of crown
	<u>3</u>	<i>Defol. 1-25% of total crown, topkill &gt;10% of crown</i>
	<u>4</u>	<i>Defoliation 26-75% of total crown, no topkill</i>
	<u>5</u>	<i>Defol. 26-75% of total crown, topkill &lt;10% of crown</i>
	<u>6</u>	<i>Defoliation 26-75% of total crown, topkill &gt;10% of crown</i>
	<u>7</u>	<i>Defoliation 76-100% of total crown, no topkill</i>
	<u>8</u>	<i>Defoliation 76-100% of total crown, topkill&lt;10% of crown</i>
	<u>9</u>	<i>Defoliation 76-100% of total crown, topkill&gt;10% of crown</i>
1400	1	Minor
	<u>2</u>	<i>Severe</i>

1500	1	Minor
	<u>2</u>	<i>Severe</i>
2000	1	Minor
	<u>2</u>	<i>Severe</i>
2100	1	Minor - DC & DB < 25% defect ( <b><i>New Code for 1998</i></b> )
	<u>2</u>	<i>Pathogen or diagnostic symptom detected-no crown deterioration</i>
	<u>3</u>	<i>Crown deterioration detected-no diagnostic symptoms</i>
	<u>4</u>	<i>Both crown deterioration and diagnostic symptoms detected</i>
2200	1	Minor
	<u>2</u>	<i>Severe</i>
2300	1	Trace infection (dwarf mistletoe=Hawksworth 1, light infection)
	2	Light infection (dwarf mistletoe=Hawksworth 2, light infection)
	3	Med. infection (dwarf mistletoe=Hawksworth 3, moderate infection)
	4	Mod/heavy infection (dwarf mistletoe=Hawksworth 4, moderate infection)
	5	Heavy infection (dwarf mistletoe=Hawksworth 5 severe infection)
	<u>6</u>	<i>Severe infection (dwarf mistletoe=Hawksworth 6, severe infection)</i>
2400	1	decline-dying tree, minor crown
	<u>2</u>	<i>decline-dying tree, severe crown symptoms</i>
	<u>3</u>	<i>(Use for decline killed tree only)</i>
2500	1	Minor
	<u>2</u>	<i>Severe</i>
2700	1	Minor
	<u>2</u>	<i>Severe</i>



2800	1	Minor
	<u>2</u>	<i>Severe</i>
3000	1	<1/2 circumference. cambium killed/damaged foliage on lower crown
	<u>2</u>	<i>&gt;1/2 circumference. cambium killed/damaged foliage on upper crown</i>
4100	<u>2</u>	<i>Feeding on bark/foliage severe</i>
	<u>4</u>	<i>Feeding on roots severe</i>
	<u>6</u>	<i>Stem clipping severe</i>
	<u>8</u>	<i>Trampling or scraping severe</i>
	<u>10</u>	<i>Terminal damage, browsing severe</i>
	<u>12</u>	<i>Terminal leader clipped, severe</i>
	<u>14</u>	<i>Girdling or stripping of bole, severe</i>
5000	1	Minor
	<u>2</u>	<i>Severe</i>
7000	1	Minor
	<u>2</u>	<i>Severe</i>
7100	1	Minor
	<u>2</u>	<i>Severe</i>

### **FIELD 5-17 Secondary Damage/Cause of Death (SD)**

See Primary Damage cause of death. If a tree has more than one type of damage, code the most severe as primary and the second most severe as secondary. Minor damages that do not effect the defect deduction or tree class can be coded under secondary damage without coding a primary damage. Include only damages detrimental to the future health of the tree.

## FIELD 5-18 Secondary Severity (SS)

See Primary Severity for a description of codes and procedures.

## FIELD 5-19 Defect, Cubic Feet (DC)

and

## FIELD 5-20 Defect, Board Feet (DB)

During the process of determining and recording species, DBH, and height, all sides of the tree should be examined for evidence of defect. The tree should be examined twice, once to determine cubic foot volume defect (DC, due primarily to rot), and a second time to determine board foot defect (DB, due to both internal rot and external form indicators).

Indicators of internal defect:

<b>Conks</b>	<i>Armillariella mellea</i> , <i>Fomitopsis pinicola</i> , <i>Ganoderma applanatum</i> , <i>Heterobasidion annosum</i> , <i>Phellinus Pini</i> , <i>Polyporus Schweinizii</i> , <i>P. Sulphureus</i> .
<b>Swollen knots</b>	caused by <i>P. pini</i> .
<b>Scars</b>	caused by logging injury, falling tree wounds, fire, or any serious injury exposing heartwood in the main bole below the merchantable top.
<b>Frost cracks</b>	in the main bole. Note: in softwoods frost cracks do not necessarily mean internal rot.
<b>Rotten stubs</b>	protruding from the main bole.
<b>Rotten burls</b>	from any cause including mistletoe if on the bole.
<b>Old broken tops</b>	broken below merchantable height.

Injuries and features which are not indicators of internal defect (non-indicators):

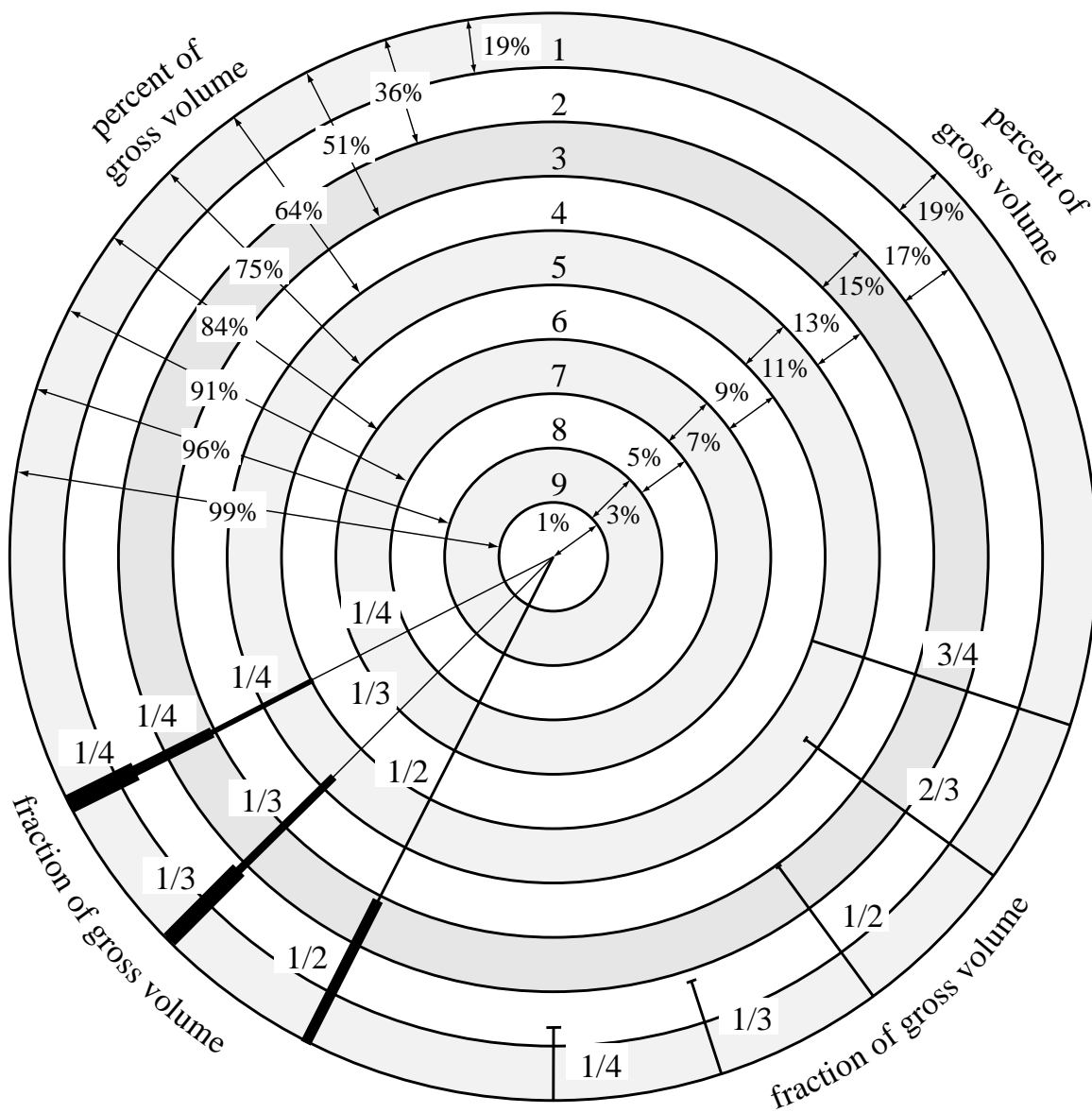
Non-indicators include dead or spike tops, broken tops above merchantable height, large dead branches in spruce, large or sucker type limbs, scaly bark, black knots, knobby or rough boles, dead sides, sound burls, and conks more than one foot from the bole on branches, newly broken tops.

The table on the following pages gives examples of some of the more common tree rots in Coastal Alaska.

<b>FUNGUS</b>	<b>POSITION</b>	<b>INDICATORS</b>	<b>DEDUCTION</b>
<u>Amillaria spp.</u> Shoestring fungus <b>CODE: 2101</b>	Base of tree ands roots	Conks rare, yellow tan; blk shoestrings & white mycellial	Cull first 5 meters of tree
<u>Fomitopsis pinicola</u> Red Belt Fungus <b>CODE: 2102</b>	Any location on main bole - abundant	Shelf-like, blackish grey w/ possible red ring. Inside creamy white	Young grwth cull 2.5 meters above/below Oldgrwth: cull 5 meters above/below conk
<u>Phaeolus schweinitzi</u> Velvet Top Fungus <b>CODE: 2103</b>	Base of tree or ground nearby	Annual, clustering; top/bottom brown velvety ylw, green or brown margin	Cull first 5 meters of tree
<u>Echinotodontium tinctorum</u> Indian Paint Fungus <b>CODE: 2201</b>	Any location on main bole.	Perennial, hoof shaped, woody, black furrowed & cracked; lower grey spines Inside rust red	Cull 6.5 m both sides of conk. Two or more conks separated by >8m cull tree
<u>Fomitopsis officinalis</u> Quinine Conk <b>CODE: 2203</b>	Branch stubs, wounds on trunk	Hoof shaped to cylindrical; white turning gray-brown with age	Single conk cull entire tree
<u>Ganoderma applanatum</u> Artist Conk <b>CODE: 2204</b>	Any location on main bole	Shelf-like conk, grey to black above w/ concentric ridges, white under turning brown when touched	Cull 5 meters around the conk
<u>Laetiporus sulphureus</u> Chicken of the Woods <b>CODE: 2205</b>	Lower main bole	Shelf-like in clusters, bright orange/yellow; soggy white when dead	Live Tree: cull 5 meters total Dead Tree: cull entire tree
<u>Phelinus pini</u> Red Ring Rot <b>CODE: 2208</b>	Any location on main bole	Perennial, shelf shaped; top dark brown, hairy; bottom rusty; inside bright rusty brown	Cull 6.5 meters above & below conk hemlock=cull whole tree

The following chart can be used along with the Tree Volume Distribution Tables to estimate the amount of defect in a tree.

## Portion of Gross Log Volume By 1/10 Diameter Units



# TABLES OF TREE VOLUME DISTRIBUTION BY 5 METER LOG

## PERCENTAGE DISTRIBUTION OF CUBIC FOOT VOLUME

TREE HEIGHT (logs)	LOG POSITION										% In Top to 10 cm DIB
	1	2	3	4	5	6	7	8	9		
1	95										5
2	65	31									4
3	49	30	18								3
4	40	26	19	12							3
5	34	23	18	14	19						2
6	30	20	17	13	11	7					2
7	26	20	17	13	11	7	4	4			1
9	21	20	17	13	11	7	4	3	2		1

## PERCENTAGE DISTRIBUTION OF BOARD FOOT TREE VOLUME

TREE HEIGHT (logs)	LOG POSITION									
	1	2	3	4	5	6	7	8	9	10
1	100									
2	69	31								
3	52	33	15							
4	39	30	20	11						
5	33	26	20	13	8					
6	27	23	19	15	10	6				
7	24	20	17	14	11	8	6			
8	21	18	16	13	11	9	7	5		
9	19	16	14	12	11	9	8	6	5	
10	17	15	13	12	11	9	8	6	5	4

## % VOLUME BY 1.25 METER SECTIONS

LOGS	<u>LOG NO 1</u>				TOT	<u>LOG NO 2</u>				TOT	<u>LOG NO 3</u>				TOT	<u>LOG NO 4</u>				TOT
PER	SECTION				PER	SECTION				PER	SECTION				PER	SECTION				PER
TR	1	2	3	4	LOG	1	2	3	4	LOG	1	2	3	4	LOG	1	2	3	4	LOG
1	31	25	23	21	100															
2	17	16	15	13	61	12	10	9	8	39										
3	13	11	11	10	45	9	9	8	7	33	6	6	5	5	22					
4	11	9	9	9	38	8	7	7	6	28	6	5	5	4	20	4	3	3	4	14

## FIELD 5-19 Defect, Cubic Feet (DC)

Cubic foot defect is a measure of unusable solid wood volume of trees  $\geq 12.5$  cm. DBH, from a .3 m. stump to a 10 cm. inside bark top, expressed as an estimated percentage rounded up to the nearest 5%. Defects such as rot, deep fire scars, and missing sections reduce cubic foot bole volume of trees. See Appendix D for some general rules on deductions for various rots.

Defects such as sweep or crook do not affect cubic wood volume. However, if a pole size tree is severely deformed, crooked or limby preventing processing as pulpwood, its entire volume is lost and cubic foot defect code is 100% (coded 99).

### DC Examples:

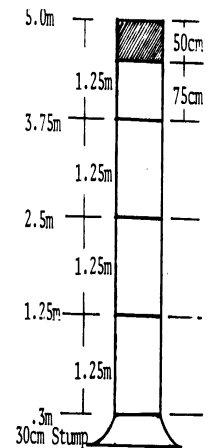
A. Cull section (rotten top, etc.). Deduct % of section affected.

Last 50 cm. in top 1.25 m. section of 1-log tree is cull.

$$1) \quad \frac{\text{length of cull}}{\text{length of section}} = \frac{50 \text{ cm}}{125 \text{ cm}} = 40\% \text{ cull in section}$$

$$2) \quad \left( \begin{array}{c} \% \text{ cull in} \\ \text{section} \end{array} \right) \times \left( \begin{array}{c} \% \text{ volume} \\ \text{from table} \end{array} \right) = \% \text{ cull}$$
$$(.40) \quad * \quad (.21) \quad = 8\% \text{ cull}$$

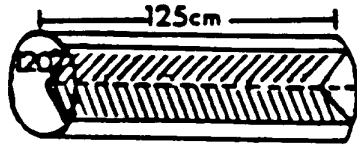
3) Record cubic foot defect as 10.



## DC Examples, continued:

B. Cull section (fire scar, etc.). Multiply % of circle by length.

Bottom 1.25 m. section of a 2-log tree has a fire scar affecting 120° of the circumference.



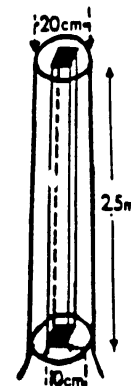
$$1) \frac{\text{angle of cull}}{360^\circ \text{ in circle}} * \frac{\text{length of cull}}{\text{length of section}} = \frac{120^\circ}{360^\circ} * \frac{125 \text{ cm}}{125 \text{ cm}} = 33\% \text{ cull}$$

$$2) \left( \frac{\% \text{ cull in section}}{\% \text{ volume from table}} \right) = \% \text{ cull}$$
$$(.33) * (.17) = 8\% \text{ cull}$$

3) Record cubic foot defect (DC) as 10

C. Interior cull (rot columns). Square up circular cull. Divide width of rot column by sections small end diameter.

Bottom 2 sections of a 1-log tree have rot column with visible indicator.



$$1) \frac{\text{diameter of column}}{\text{diameter of section}} * \left( \frac{\% \text{ volume from table}}{\% \text{ volume from table}} \right) = \% \text{ cull}$$
$$\frac{10 \text{ cm}}{20 \text{ cm}} * (.25 + .31) = 28\% \text{ cull}$$

2) Record cubic foot defect (DC) as 30.

## FIELD 5-20 Defect, Board Feet (DB)

Board foot defect is an estimate of the percent (rounded up to the nearest 5%) of the board foot sawlog tree volume culled due to a combination of form (sweep, crook, frost cracks, etc.) and rot defect in **sawtimber**. Defect is estimated within a bole from a .3m stump to: a merchantable top of 15 cm inside bark for softwood trees  $\geq 22.5$  cm.; and to a merchantable top of 20 cm. inside bark for hardwood trees  $\geq 27.5$  cm. DBH.

Board foot defects are those, which reduce lumber recovery of a tree; they may or may not reduce **cubic foot** volume. These defects include rot, sweep, crook, lightning scars, deep cracks and splits. Defects which can be removed with slabbing do not constitute a loss of bd. ft. volume, e.g. sweep with a departure of  $< 5$  cm. per 5 m. log length should not be deducted.

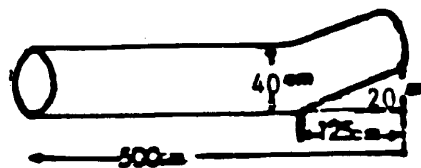
Cubic Foot Defect (DC) and Board Foot Defect (DB) are independent estimates. A certain defect may be counted in both DC and DB if it affects both cubic foot volume and board foot volume. DB usually exceeds DC when both are present.

### DB Examples:

#### A. Crook

Multiply proportion of diameter displaced by proportion of log length affected by crook by % volume in section.

Crook in last 1.25 meters of a 1-log tree; no cubic defect.



$$1) \frac{\text{displacement}}{\text{total diameter}} * \frac{\text{length affected}}{\text{total log length}} * \left( \begin{array}{c} \% \text{ volume from} \\ \text{table} \end{array} \right) = \% \text{ cul}$$

1

$$\frac{20 \text{ cm}}{40 \text{ cm}} * \frac{125 \text{ cm}}{500 \text{ cm}} * (.21) = 3\% \text{ cull}$$

2) Record board foot defect (DB) as 05.

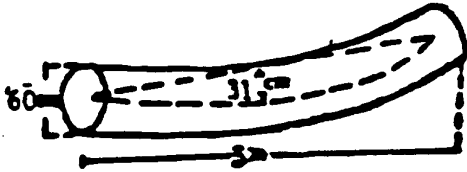


## DB Examples, continued:

### B. Sweep

Determine departure over entire section. Subtract 2.5 cm. from departure for 2.5 m. logs, 5 cm. for 5 m. logs. Divide modified departure by estimated small end diameter of log.

Sweep in top 5 m log of a 2-log tree.



$$1) \frac{\text{departure (cm)} - 5 \text{ cm per log}}{\text{diameter (small end)}} * \left( \begin{array}{c} \% \text{ volume from} \\ \text{table} \end{array} \right) = \% \text{ cull}$$
$$\frac{31 \text{ cm} - 5 \text{ cm}}{60 \text{ cm}} * (.39) = 16.9\% \text{ cull}$$

2) Record board foot defect (DB) as 20.

## FIELD 5-21 Tree Class (TC)

Determined for live trees and estimated for dead trees **at time of death**.

The primary purpose of Tree Class is to label a tree as growing stock or cull. Tree Classes 10, 20, and 21 are growing stock. Tree class 21 are trees that have a negative growth potential and survivability. Tree classes 30 and 40 are cull.

Growing stock trees having no serious defect in quality limiting present or prospective use. They are of relatively high vigor and have no pathogens that may result in death or serious deterioration before the tree reaches rotation age (producing marketable products). These

include trees forest managers aim to grow, i.e., the trees left in silvicultural cutting or favored in cultural operations.

- 10 Vigorous** (Desirable) - PD must be 00. SD not coded severe and not seriously affecting tree quality, vigor, and survival. DC and DB must both be 00 for live trees. Growth in the next ten years is likely to be equal or greater than current. If commercial species, meets or exceeds minimum standards for products.
- 20 Stable** (Acceptable) - PD not 00. PD, SD and cumulative damage may not use severity codes forcing a TC 21 or higher, i.e. severity must be minor (see severity section). DC or DB below limits for TC 30 or 40 (see below). Growth in the next ten years is likely to be equal or slightly less than current. If commercial species, meets or will meet minimum standards for products.
- 21 Deteriorating** - PD not 00 Severity code is coded severe (see primary severity code list), **and/or** defect is  $\geq 25\%$ , **and/or** ten year survivability of the tree is questionable. Defects must be less than limits for TC = 30 or 40. PD & SD not forcing a TC = 30 or 40.
- 30 Rough** - PD may not be 00. PD, SD and cumulative damage must have severe codes forcing a TC 21 or higher, i.e. severity must be severe (see severity section). Includes seedlings, saplings, and poletimber that will not produce marketable products due to pathogen, etc. Also, trees of < sawtimber size having DC  $\geq 50$ , mostly form defect and Sawtimber with DB  $\geq 70\%$ , mostly in form defect.

If Severity Code = Severe (see severity list) **and**:

Tree does not contain, now or prospectively, a merchantable (4 m X 22.5 cm) softwood sawlog or (3 m X 27.5 cm) hardwood sawlog. **(includes all size classes)**

Wolf Tree (PD or SD 2809) - Sound trees which occupy excessive crown space (limby) and occur as dominants or codominants.

Suppression (PD or SD 2702) - Saplings and seedlings ( $< 12.5$  cm DBH) which are not and will not become growing stock trees because of suppression.

Uprooted (PD or SD 5002, 5008 5010, 7105) or Leaning Excessively (PD or SD 2701)

Fire damage (PD or SD 3000)

Lack of Drainage (PD or SD 5001) trees growing in conditions not conducive to producing merchantable stems.

**40 Rotten** - Requires PD = 2000 - 2210. . PD, SD damage must have severe codes forcing a TC 21 or higher, i.e. severity must be severe (see severity section) and  $DC \geq 50$ , mostly lost in rot. Sawtimber with  $DB \geq 70$ , most lost in rot.

Sawtimber cull trees do not contain, now or prospectively, a merchantable (4 m X 22.5 cm) softwood or a (3 m X 27.5 cm) hardwood sawlog.

## **FIELD 5-22 Old Growth (OG)**

For sawtimber trees ( $\geq 22.5$  cm SW,  $\geq 27.5$  cm HW) indicate whether the tree is old growth ( $\geq 150$  years). On trees where age is not known estimate old growth using information from other trees that have been bored for age or bore a few sample trees to get an idea of the size to age relationship.

## FIELD 5-23 Site/Age Tree (ST)

CODE	DEFINITION
------	------------

0	tally only, NOT age or site
1	tally, age tree
2	tally, site tree
3	tally, site and age
7	non-tally, age
8	non-tally, site
9	non-tally, site and age

### AGE TREES

Bore 3 AGE trees per polygon type. Each must represent stand age for the polygon type. In uneven aged stands use the age that predominates.

### SITE TREES

Bore 3 SITE trees a per polygon type. Site trees should be relatively free growing, and distributed evenly over the vegetation type. Site tree species should be the same as the species recorded for Land Cover Type (LCT) for each polygon type. In the case of **mixed forest types, collect 3 site trees for each of the primary species that make up the stand**. Open grown and "wolf" trees (damage code 2809) should not be used

Suitable site trees are:

1. 12.5 cm. DBH or larger. If diameters < 12.5 record in tree's notes.
2. Tree species should match forest type for the polygon
3. Tree Class: desirable (10) or acceptable (20)
4. Crown Class: dominant (2) or co-dom (3) throughout their lives.
5. Vigorously growing.
6. Age > 40 years and < 250 years if possible

**Non-Productive - Low site:** Many low site vegetation classes, as in lodgepole pine and mixed conifer, do not contain trees meeting the above site tree criteria. In these cases collect at least 3 site/age trees (<250 years old if possible) that will work the best. If tree ages are all greater than 250 years collect age trees and record “NONPROD” in the notes field of the Polygon Record.

**Extreme care should be used in selecting site trees.** Site information is used in critical calculations of growth and volume so trees picked to represent site for a forest polygon type need to be the best representation of the site potential for that type. Stick to the guidelines and do not always rely on tally trees for good site trees.

### **FIELD 5-24 Radial Growth, mm (RG)**

The 10-year radial growth is measured in millimeters, round down to the nearest whole millimeter.

Bore the first live tally tree,  $\geq 12.5$  cm., TC = 10, 20, or 21 of each species, in each 5 cm DBH class, in each polygon type. The Husky data recorder will prompt for and keep track of growth trees as the tally trees are measured.

The increment core should be obtained immediately below the point of DBH measurement. Diameter classes are identified by the lower endpoint, e.g. 10.0 - 14.9 cm DBH is 10 cm diameter class.

### **FIELD 5-25 Age of Tree, years (Age)**

Measure and record breast height age for all 3 site and 3 age trees. Age trees are used to determine stand age and so trees selected for this purpose must be representative of stand age for the polygon type. Trees selected as site trees may or may not represent stand age, but should be representative of the site potential.

Trees used for either site or stand age may or may not be tally trees.

When rot interferes or tree size is too large to bore to pith, age can be estimated by extrapolating using the existing readable core and the

tree radius. All estimated ages must be noted in the Note field. **Site tree ages will not be estimated.**

Tree cores can be aged in the field or returned to the lab for counting utilizing dissecting scope. Field crews are allowed to exercise their discretion but are encouraged to bring cores to the lab for counting. Tree cores do not need to be kept.

See Appendix F for information on using tree borers.

### **FIELD 5-26 Number of Seedlings (NS)**

Seedlings are trees < 2.5 cm. DBH and are the last trees to be recorded on each point. They are tallied if they stand within a 2 m. fixed radius plot. Record the total number of seedlings by species, tree class, and average height; if trees occur in 2 distinct layers, make 2 entries, one for each layer height.

### **FIELD 5-27 Dead Wood Type**

Dead wood type describes the integrity of the heartwood and sapwood of a tallied snag or log. The wood is simply judged as being hard or soft. The first character is the condition of the sapwood and the second character is the condition of the heartwood. Base dead wood type on the overall condition of the stem as best as can be judged.

CODE	DESCRIPTION
------	-------------

HH	hard sapwood/hard heartwood
HS	hard sapwood/soft heartwood
SS	soft sapwood/soft heartwood
SH	soft sapwood/hard heartwood

### **FIELD 5-28 Break Type**

Break type is a description of the type of break, if any, that is encountered on the tallied snag or log. A break requires the piece of

wood to be fully severed from the adjoining piece. For snags, the snag height must be  $<$  total height if the break type is B.

CODE	DESCRIPTION
------	-------------

I	intact, no breaks
B	discernible break across main axis
L	longitudinal break (split)
S	severed by mechanical means (saw, axe) <b>not for snags</b>

### **FIEL 5-29 Notes**

Record notes up to 70 characters long regarding the given tree. If more than 70 characters are needed, refer to a note on paper (on the Location Record form, etc.). Access Notes from the Husky Tree Record by pressing the F4 function key. Enter the note and press the YES (Return/Enter) or the F4 key to save the note. Press ESC to exit notes without saving the entry.

## SECTION 6

### HORIZONTAL/VERTICAL PLOT

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## INTRODUCTION

At one point within each distinct polygon type, a 5.64 m radius circular plot will be established around point center. Each HV plot covers 100 m<sup>2</sup>. These plots will be used to determine the horizontal and vertical distribution, density, diversity, and composition of plants and non-living material. By combining the data from trees  $\geq 2.5$  cm measured on the tree plot with the HV Record data an overall horizontal and vertical profile can be generated for the sampled vegetation type.

The Horizontal/Vertical profile plot (HV) is established on the first point each particular polygon type is encountered. If a HV plot is split between 2 polygons or a polygon and inclusion, the HV is not established on that point. Instead establish an HV on the next point. It may be possible to establish the HV on split points, because the smaller HV plot circle may not be split by mapped polygon boundaries on the larger 7.3m plot. In general the goal is to describe the typical species composition associated with each polygon and not a mixture of two distinct types. In some cases a polygon type may not be described because every point on which it occurs is split.

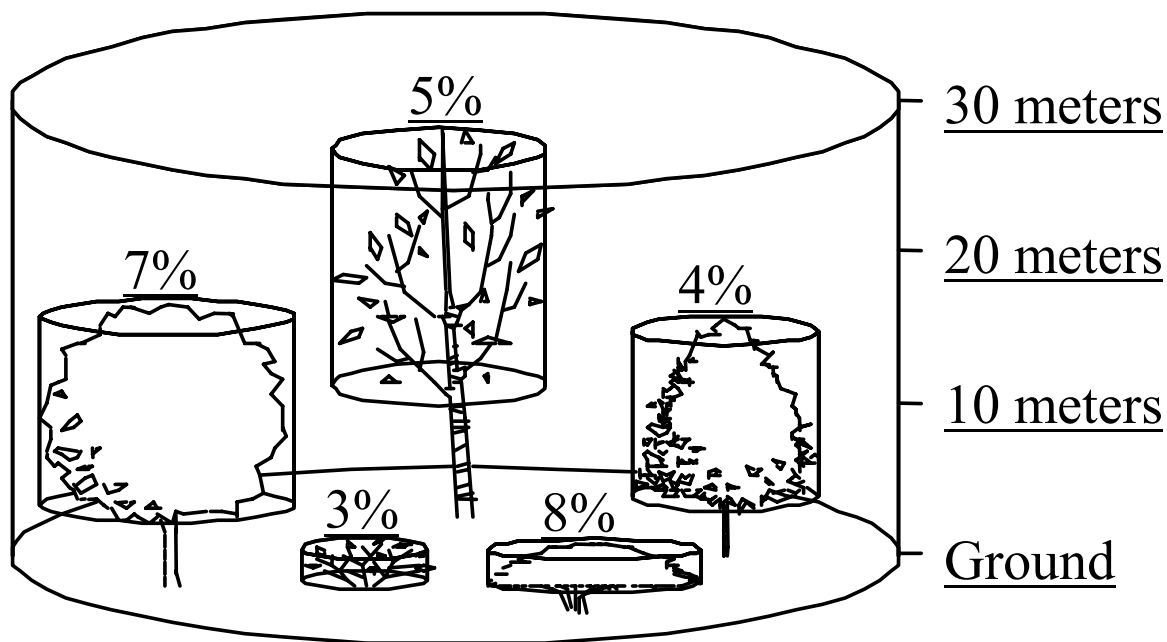
Data will be collected on these plots for shrubs, grasses, forbs, lichens, mosses, tree seedlings (trees  $\leq 2.5$  cm. at DBH), tree-like shrubs (e.g., alder and willow), Krummholz trees not recorded on the tree plot, and all other vegetative lifeforms. This vegetation will be classified into layers starting at ground level. Each layer's vertical dimensions are estimated using the natural layer breaks observed on the HV plot.

The horizontal/ vertical profile plot DOES NOT include stems or branches from trees or saplings  $\geq 2.5$  cm dbh. Data on trees and saplings  $\geq 2.5$  cm is measured and recorded on the Tree Record (see Tree Record Section). However, the HV Record does include all seedlings and all arboreal lichens/mosses/fungi growing on tally trees and saplings.

**Note - Krummholz stands:** Low Site/ Krummholz stands are stands where the trees are growing in a twisted/stunted shrub-like form and trees will never produce a 4m log. These stands are treated as shrubland. Thus, all Krummholz tree species are included on the HV regardless of their diameter (these trees are not measured on the tree record). In measuring these stands for the HV, the foliar cover of the stunted trees will be measured (do not try to account for the bole of the tree).

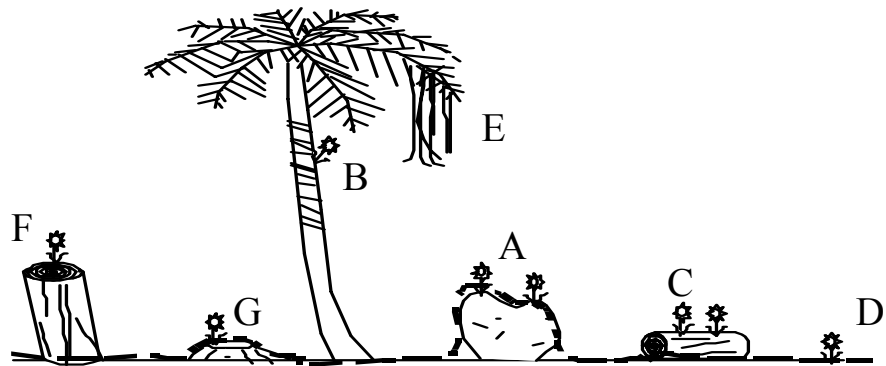
## THE SPACE OCCUPANCY CONCEPT

Distribution of live vegetation and non-living material occurring within the bounds of these 100 m<sup>2</sup> plots will be estimated using the space occupancy concept illustrated below. The purpose is to describe the average amount of space occupied by specific vegetation.



Ground level includes the inorganic (rock, mineral soil) or humus substrate in which the plant is rooted. The cover of plants growing on boulders is estimated treating the boulder as ground level; however, plants growing on stumps are recorded in the layer which corresponds to the height of the stump above ground level. Therefore, when "ground cover" plants are elevated on stumps or logs, it is possible to record them in the same layer as the crowns of tall shrubs. Severely decomposed logs will be considered part of the soil; logs which still retain their original shape will be considered as occurring above ground level.

60 dm  
50 dm  
40 dm  
30 dm  
20 dm  
10 dm  
ground



- Plant A      growing on boulder occurs between ground level and 2 decimeters
- Plant B      growing on bark of tree is at 35 decimeters
- Plant C      growing on sound log occurs between 5 & 9 decimeters
- Plant D      occurs between ground level & 2 decimeters
- Lichen E     in palm occurs between 32 & 47 decimeters
- Plant F      on stump occurs between 15 & 20 decimeters
- Plant G      growing on decomposed stump occurs between ground level & 2 decimeters.

## **FIELD 6-1     Location ID**

Location ID is a unique alphanumeric code identifying each four-point sample cluster. The first three characters are alpha and are USGS 1:250000 map sheet abbreviations. The next four characters are numeric and represent the grid intersection number that each sample location corresponds with. Example: COR0163 identifies location 163 on the Cordova map sheet. Location number can be found on the Location Folder and the Ortho Photo.

## **FIELD 6-2     Point Number**

Numeric code for the four-point cluster subplot that the HV Plot is installed on. Valid codes are 1 through 4.

## **FIELD 6-3     HV Vegetation Type**

Record the code for the Alaska Vegetation Classification type that the HV plot is describing. The Vegetation classification is recorded to the fifth level of the classification hierarchy. Level 5 (plant communities) has been modified so that community descriptions for a major type can be used regardless of the percent overstory canopy closure.

Use **Appendix A** (MVT Quick Reference) and **Appendix B** (Level 5 listing) to assign the best MVT name to the vegetation type being sampled on the HV plot (see Polygon Record Section for more information on MVT).

If the vegetation at the point is not described at level 5, use code 99 (Undescribed Type) and describe the vegetation in the note section on the HV record.

## **Special Cases**

*Clear Cuts:* If the HV falls in a clear cut then special considerations must be given to the coding of the MVT. Since the vegetation in clear cuts is altered it may not fit into the vegetation classification system. Determine the MVT as best as possible based on existing vegetation and use the code 98 for the level 5 call (Ex. 2B1B98). The level 5 code of 98 indicates the plot was measured in a clear cut. Make a note on the HV Record (see also Polygon Record).

*Inclusions:* It is important the vegetation type recorded for the HV is a reflection of what is being described on the HV plot. If the HV falls in an inclusion, the HV vegetation type (a.k.a. inclusion MVT) should reflect the vegetation actually present. An inclusion occurs when the vegetation type being examined on the HV plot does not match the MVT classified on the polygon record and the area of the vegetation type being sampled on the HV plot is  $\geq .2$  ha. but  $< .4$  ha. If the HV vegetation type area is  $< .2$  ha. then it is too small to be either a polygon or an inclusion and should be treated as existing variation in the MVT, coded the same as the Polygon Record MVT, and the HV should be measured for the point

When working in an inclusion the inclusion flag should be marked **Yes** and the inclusion MVT recorded on the location record.

Because the polygon MVT is describing the predominating vegetation type around the inclusion, it will generally be a very different code than the inclusion MVT.

Valid codes: See manual Appendix A & B.

*Krummholz*: Low Site/Krummholz stands are coded using Scrub Dwarf Tree (2A \_ \_) MVT codes.

## **FIELD 6-4    Inclusion Flag**

The Inclusion Flag is used to indicate if the HV plot is established in an inclusion. An inclusion occurs when the vegetation type being examined on the HV plot does not match the MVT classified on the polygon record and the area of the vegetation type being sampled on the HV plot is  $\geq .2$  ha. but  $< .4$  ha.

If the HV vegetation type area is  $< .2$  ha. then it is too small to be either a polygon or an inclusion and should be treated as existing variation in the MVT, coded the same as the Polygon Record MVT, and the HV should be measured for the point.

Valid codes:

- |   |  |
|---|--|
| Y | Yes, HV vegetation type is an inclusion ( $\geq .2$ ha & $< .4$ ha) different from the Polygon Record MVT. |
| N | No, the HV vegetation type is not an inclusion; same as Polygon Record MVT.                                |



### **FIELD 6-5 Recorder's Initials**

Initials of person estimating and recording HV data.

### **FIELD 6-6 Date**

Date that the HV plot was finished using the format: mm/dd/yy

### **FIELD 6-7 Top of Layer Height**

The Top of Layer Height is an estimate of the height of the top of a particular layer. For each layer, the height of the foliage will be recorded as a 3-digit code to the nearest decimeter (dm). The first layer, starting at the ground surface, will have a Top Height of 000 and include most mosses, lichens, and special components (see FIELD 6-9). Succeeding layers will always run from the top of the preceding layer to the next natural height break. Layer heights should include all major breaks in the vegetation excluding trees that are  $\geq 2.5$  cm dbh (except in the case of krummholz stands).

Valid codes: 000 through 999 in decimeters.

### **FIELD 6-8 Percent Cover By Layer**

The Percent Cover By Layer describes the combined cover of all vegetation and special components on the 5.64 m radius plot in the layer being recorded. Percent cover is recorded to the nearest percent (%). Note that Layer 1, (ground) always has 100 percent cover. Do not include foliage from low hanging limbs of trees that are  $\geq 2.5$  cm

dbh (except in the case of krummholz stands). Note: tall plants can contribute to more than one layer. Valid codes: 001 through 100.

## **FIELD 6-9    Vegetation Species & Special Components**

Within each layer, the percent composition (percent cover) and composite cover of all plants and non-living components in that layer are estimated and recorded. For plants, additional information is collected on phenology that is applicable to each plant in all layers on the plot.

The Vegetation Species & Special Components are alphanumeric codes that describe the plants and special components present on the HV plot. Plant codes are from the USDA, Natural Resources Conservation Service - PLANTS database.

In addition to cataloging plant species and their cover, special components are listed as default categories in a space above where the plant species can be entered. (*Note:* many of the special components exist only in the ground layer, Layer 1. Also, mosses and lichens generally occur in the ground layer except when found on trees, snags, stumps, and down wood.)

Valid codes for special components are listed below. A partial list of commonly used plant species codes is in Appendix C, listed alphabetically by life form. Remember that the same plants may occur in more than one layer.

For all species that cannot be identified positively in the field, specimens should be brought back and keyed out using reference materials in the lab.

### **SPECIAL COMPONENTS**

WATERST	Water, standing - lakes and ponds
WATERFL	Water, flowing - Streams and creeks
GROUND	Exposed mineral soils (root wads slides, cut-banks) NOT: leaf litter or duff (generally <5% cover)
ROCK_S	Rock, solid - includes exposed large boulders
ROCK_B	Rock, broken - < 2 meters in size
RESIDUE	Residue & litter - includes decomposing litter, not mineral soil
DOWNWD	Downed wood - all dead and down woody debris on ground and above. Includes wood tallied on DW plot.
BASAL	Basal vegetation - only ground level stems of all live vascular plants except trees $\geq 2.5$ cm <sup>7</sup> . (generally < 5% cover)
STUMPS	Stumps (<1.37m tall, no diameter limit)
SNAG	Snags ( $\geq 1.37$ m tall, no diameter limits)

## **PLANT CODES**

Valid plant codes are listed in Appendix C. There are a few rules that must be followed when coding the plant species:

1. Use the valid codes from the manual.
2. For species not listed write the full scientific name on the HV and highlight it with a highlighter.
3. All unknown mosses, lichens, hepatics, and forbs should be lumped together into their major categories (FORB, MOSS, etc.). The following are not acceptable codes MOSS1, MOSS2, FORB1, FORB2, etc.
4. If you cannot identify a plant to species then record it to the genus, if possible. It is better to generalize and be correct than to guess and be wrong.
5. Do not enter more than one record per species.

## FIELD 6-10 Phenology

Phenology is a numeric code for the level of plant development for each vascular plant species recorded on the HV plot. **Non-vegetation (all special components), mosses, lichens, and liverworts do not receive a phenology code.** Record the stage of plant development for the current season's growth. Phenology codes are subjective, based on the vegetative portions of current year's growth on shrubs and perennials, and the entire plant for annuals. If the phenology varies for a plant species record the code that describes the majority of the plants on the plot.

Code	Description
1	Early < 75% of individuals fully leaved.
2	Peak Biomass $\geq$ 75% of individuals fully leaved.
3	Senescence > 25% of individuals are yellowing.
4	Dying > 75% of individuals are yellowed and "dying."
5	Dead/Dormant

## FIELD 6-11 Percent Composition By Species Within Layer

The Percent Composition By Species Within Layer is a numeric code describing the percent composition occupied by each species within each layer (1 through 7). For each species and special component estimate composition to the nearest percent. For species or components that have less than 1 percent cover (i.e. trace amounts) record 1 percent. Remember, the total composition cover for all species / components within a particular layer must equal 100%.

Cover is based entirely on the current plant conditions at the time of sampling. Do not “project” cover to adjust for future plant growth. If plot is visited “too early” to ensure an accurate sample of plant species, then do not do HV and record “Early Phen – Not Done” on the HV form. The determination of “too early” is based on phenology of plants and number of expected species present.

The composition percentages for each species and special component within the layer must add up to 100%. For example a layer that has a 50% total cover might be composed of 45% VACCI, 35% RUSP, and 20% MEFE which added up make 100% of the composition for the 50% cover of that layer. Valid codes: 001 through 100 (*Note: 000 is not a valid code*).

## **FIELD 6-12 Composite Cover**

A separate sampling and measurement procedure is employed to measure each plant species’ composite cover. The same ground area is used as in the HV measurement (a circular 100 m<sup>2</sup> plot). The same plants are examined, but the two measurements are not otherwise related to one another.

Some ecologists use a different measure of plant cover by species in keying out plant associations. They desire a cover estimate that ignores layering and measures one composite-foliar-cover estimate per species. *Composite cover* is **the total shadow area a plant species (or special component) would have if a light was projected from directly overhead**. Thus, any overlapping leaf area within the same species does not add additional cover to the shadow area.

Each plant species is estimated independent of other species (as if the other species were not present) so that overlap by leaves of competing species will not affect the shadow area of the species being measured.

To estimate composite cover, visualize looking down on the plot from above and estimate the cover of the component, ignoring all other components.

Because this measurement is separate from, and not related to, the HV measurement system, it is recommended that plot area be evaluated for composite cover before the HV plot measurement is started.

### **FIELD 6-13 Plant Notes & Field Notes**

Notes can be taken for any peculiarity on the HV plot. If the note is related to the entire location, it should be made on the Location Record. If it is associated with individual species, or layers, the Notes field, next to the species field, can be used. For general notes on the HV use the Field Notes section along the side of the form.

### **FIELD 6-14 Layer Totals**

Layer Totals is a numeric code for the cumulative cover of all species and special components within an individual layer. Layer Total must add up to 100. Layer Totals should be checked in the final edit of the HV to ensure they add up to 100%. Note the following exception: Composite Cover does not need to be totaled. Valid code: 100.

## **FIELD 6-15 Age of Clearcut**

Record the number of years from the time the stand was cut to the present. Age is recorded in 5-year classes. Most cuts over 5 years old can be aged by cutting seedlings or brush at their base and counting the rings. Note: the Vegetation Type for the polygons in clearcuts must have a 98 coded at level 5. Vaild codes:

<b>Code</b>	<b>Description</b>
1	1 - 5 Years
2	6 - 10 Years
3	11 - 15 Years
4	16 - 20 Years
5	21 - 25 Years

## **Field 6-16 Size of Clearcut**

Record the estimated size of the clearcut using the following codes:

<b>Code</b>	<b>Description</b>
1	Small {< 20 hectares (50 acres)}
2	Large {≥ 20 hectares (50 acres)}



## SECTION 7

### DOWNED WOOD RECORD

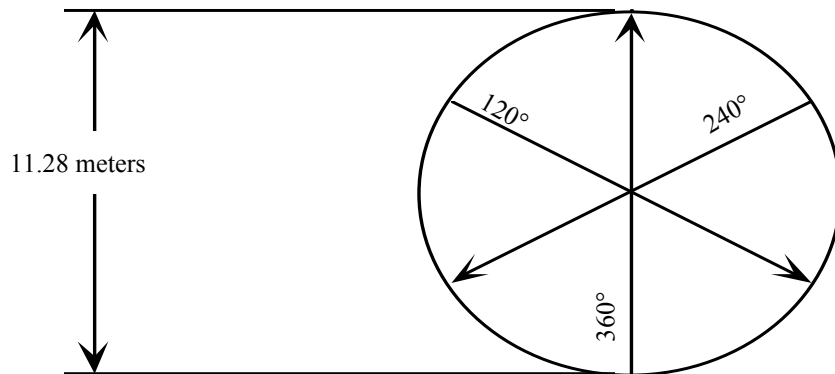
Field No.	Field Description	Page
	General Field Instructions.....	3
7-1	Transect Number .....	5
7-2	Species .....	5
7-3	Diameter Large End.....	6
7-4	Diameter Small End.....	6
7-5	Length.....	7
7-6	Percent Decay .....	7
7-7	Log Stage.....	8
7-8	Dead Wood Type.....	9
7-9	Break Type .....	9
7-10	Notes.....	9



## Downed Wood Plot

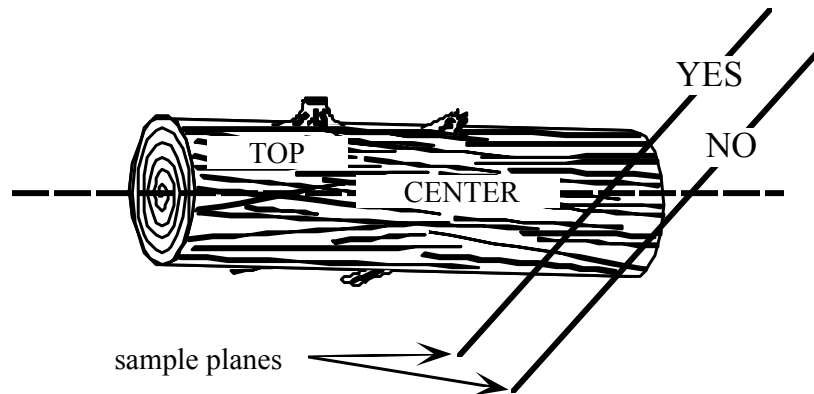
Information on dead and downed wood will be collected along three 11.28 meter transects on every H-V plot regardless of vegetation type. Thus, for many plots all three down wood transects will have no down wood present. For example a alpine vegetation plot without any trees present will still be measured for down wood and records entered into the Husky.

Transects are centered across the plot following azimuths of  $360^\circ$ ,  $120^\circ$ , and  $240^\circ$ . Each transect is recorded in the Husky even if down wood is not present.



Measurements are taken on tree stems that are  $\geq 2.5$  cm at the large end. Dead and downed wood is made up of the dead boles, portions of boles, or primary branches that have been severed from their bases and lie on or above the ground. A leaning snag is considered downed wood if it is severed from its base or intact and leaning less than  $15^\circ$  from horizontal (the ground). Large secondary or small branches and stems of woody shrubs are not considered in the downed wood plot. Do not tally undisturbed stumps. Tree pieces are tallied if the transect line crosses over the central axis of the piece (see diagram below).

Information collected on the downed wood plot is independent of the tree plot. It is possible for downed trees tallied on the tree plot to also be tallied on the downed wood plot. It is also possible for downed wood pieces to be tallied more than one time on each point (e.g. same piece crosses the 120 and 360 transects).



*--An intersection at the end of a branch or log must include the central axis to be tallied.*

Down wood is recorded on the Husky data recorder. Enter the down wood program from the main menu of the SEAK Inventory program. You will need to enter or verify the location number and then enter the point number that you are working on.

The down wood program requires that you enter data in the order that it appears on the screen. The data must be valid to be able to go to the next variable. Additional pieces can be added to the record at anytime by simply pressing the F2 key and selecting the insert option or by pressing the PgDn key then return when on the last record.

## FIELD 7-1      Transect Number

Record the point and transect number that corresponds to the line of information being recorded. Each plot will have 3 transects labeled 360, 120, 240 corresponding to the azimuth of the transect. The transect number is still recorded even if the transect does not have any downed wood tally.

## FIELD 7-2      Species

Record the appropriate species code.

CODE	SPECIES	CODE	SPECIES
<b>Softwoods</b>		<b>Hardwoods</b>	
11	Pacific silver fir	310	maple sp. (tree form only)
19	subalpine fir	351	red alder
42	Alaska yellow cedar	375	paper birch
71	tamaraack	660	apple
94	white spruce	746	quaking aspen
95	black spruce	747	black cottonwood
98	Sitka spruce	920	willow sp. (tree form only)
108	lodgepole pine	200	Undetermined Hardwood
231	Pacific yew		
242	western redcedar		<b>No Tally</b>
263	western hemlock	999	no tally on transect
264	mtn. hemloc		
100	Undetermined softwood		

If species can not be determined record: 100 for softwood and 200 for hardwood.

**Krummholz stands:** Low Site/ Krummholz stands are stands where the trees are growing in a twisted/stunted shrub-like form and trees will never produce a 4m log. These stands are treated as shrubland. However, for down wood transects, **all pieces of down wood** (meeting the minium size requirements) from tree species will be tallied regardless of tree growth form with expceptions for willow and alder species

**Willow and maple:** Only tally down wood from willow and maple species when they have achieved and appear to maintian an “upright tree growth form”. If willow on a plot is determined to be of “tree growth form” then all pieces of down wood from willow species are talled.

**No Tally Transects:** For each transect with no tally record 999 under the species field. Remember each transect must be recorded seperatily even if all the transects lack the presence of down wood.

### **FIELD 7-3      Diameter Large End**

Measure the diameter of the large end of the piece to the nearest **cm**. Record as a three digit code. To be sampled a piece must be  $\geq 2.5$  cm large end (approx. 3 cm).

### **FIELD 7-4      Diameter Small End**

Measure the diameter of the small end of the piece to the nearest **cm**. Record as a three digit code. If the piece tapers off to a point, record a diameter of 000.

**FIELD 7-5      Length**

Record the length of the piece to the closest decimeter. Record as a three digit code.

**FIELD 7-6      Percent Decay**

Record to the nearest 5% the amount of rotten or otherwise missing wood in the piece being tallied. This is basically the cubic volume of decayed wood fiber.

## FIELD 7-7      Log Stage

Record the log stage that best describes the piece.

### CODE   DESCRIPTION

- 1    bark tight and intact; branches and twigs present; cross section retains original shape; bole is ridged.
- 2     $\leq$  50% of bark loose/missing; primary branches missing; cross-section original shape; if down bole may sag unless supported.
- 3    up to 75% bark missing or decayed; primary and secondary branches missing or broken; cross-section may be distorted from original shape; if down, bole is sagging or fully supported by ground.
- 4    more than 75% bark missing or decayed; most primary branches absent or broken; cross-section, partially eroded and top may be broken; if down, bole is sagging or fully supported by the ground.
- 5    bark and all limbs absent or decayed; cross-section severely distorted or eroded from original shape; top possibly broken; if down, fully supported by the ground or merging with the soil layer.



### **FIELD 7-8      Dead Wood Type**

Dead wood type describes the integrity of the heartwood and sapwood of the down wood piece being tallied. The wood is simple judged as to being hard or soft. The first character is the condition of the sapwood and the second character is the condition of the heartwood. If heartwood / sapwood condition changes along the length othe piece, record the condition at the point of intersetion with the transect.

CODE	DESCRIPTION
HH	hard sapwood/hard heartwood
HS	hard sapwood/soft heartwood
SS	soft sapwood/soft heartwood
SH	soft sapwood/hard heartwood

### **FIELD 7-9      Break Type**

Break type is a description of the type of break, if any, that is encountered on the tallied piece. A break requires the piece of wood to be fully severed from the adjoining piece. When several breaks exists code the most severe.

CODE	DESCRIPTION
I	Intact, no breaks
B	discernible break across main axis
L	longitudinal break (split)
S	severed by mechanical means (saw, axe)

### **FIELD 7-10      Notes**

Record up to 70 characters of comments regarding the given wood piece. Access the Notes field from the Husky point record by pressing the F4 function key. Enter the notes for the point then press the Yes (Enter/Return) or F4 key to save the note or press Esc to exit notes without saving the changes.

## SECTION 8

### SOIL RECORD

Field  
Number

Soil Form .....	2
Introduction .....	3
<b>8-1</b> Slope Shape Horizontal.....	3
<b>8-2</b> Slope Shape Vertical.....	4
<b>8-3</b> Microtopography.....	4
<b>8-4</b> Slope Position .....	5
<b>8-5</b> Rooting Depth.....	5
<b>8-6</b> Depth To Bottom Of Live Moss .....	5
<b>8-7</b> Depth To Bottom Of Slightly Decomposed Oi (Fibric) Organic Material .....	6
<b>8-8</b> Depth To Bottom Of Moderately Decomposed Oe (Hemic) Organic Material .....	6
<b>8-9</b> Depth To Bottom Of Highly Decomposed Oa (Sapric) Organic Material .....	7

**Soil Form**

**SOIL**

Location:  Date:  Recorder Inits:

Poin	Hz_Shape	Vt_Shape	Top	Position	RootDpth	MossDpth	FibricDpth	HemicDpth	SapricDpth
			-		-	-	-	-	-
			-		-	-	-	-	-
			-		-	-	-	-	-
			-		-	-	-	-	-

Notes and Diagrams:

## Introduction

Record site and soil features from a sample taken within a 10 meter radius of every sample point. However, the profile should best represent a 100 meter<sup>2</sup> area (5.64 meter radius) around the sample point.

All measurements will be recorded in centimeters (cm) and depths will be taken from the ground-air surface. Disregard small strands and extended clumps of moss or lichens and begin measuring the surface where the moss or lichen becomes a continuous mat on the surface. Avoid a spot that has an unusual clump or tussock of moss or a mound from a buried decomposing limb or root. All depth measurements will include moss and organic layers but not twigs and undecomposed wood debris on the surface.

Measurements will be made down to 30 cm. below the top of mineral soil or to a maximum total depth of 50 cm., whichever is shallower.

### FIELD 8-1 Slope Shape Horizontal - Hz\_Shape

The dominant horizontal (parallel to contours) slope shape of the landform at the data (point) site.

CODE	DESCRIPTION
<b>B</b>	Broken, e.g., V-notches, rock outcrops
<b>C</b>	Concave, e.g., slope curving inward (swale)
<b>X</b>	Convex, e.g., slope curving outward (hummock)
<b>F</b>	Flat, e.g., no slope
<b>S</b>	Straight or Smooth, e.g., slope is straight or smooth
<b>U</b>	Undulating, e.g., combination of concave and convex

## **FIELD 8-2 Slope Shape Vertical - Vt\_Shape**

The dominant vertical (perpendicular to contours) slope shape of the landform at the data (point) site.

CODE	DESCRIPTION
<b>B</b>	Broken, e.g., benches or ledges
<b>C</b>	Concave, e.g., slope curving inward (swale)
<b>X</b>	Convex, e.g., slope curving outward (hummock)
<b>F</b>	Flat, e.g., no slope
<b>S</b>	Straight or Smooth, e.g., slope is straight or smooth
<b>U</b>	Undulating, e.g., combination of concave and convex

## **FIELD 8-3 Microtopography - Topo**

This characterizes the variability of the soil surface form. The intent is to estimate the amount of soil mixing; in Coastal Alaska, this mixing is primarily due to uprooting of trees. Care should be taken to exclude fallen logs and decayed stumps from the determination of class.

CODE	DESCRIPTION
<b>SM</b>	Smooth — few or no mounds; surface profile is linear
<b>MI</b>	Micromounded — mounds are less than 0.3 m. in height
<b>SL</b>	Slightly mounded — mounds are 0.3 m. - 1 m. high and > 7 m. apart
<b>MO</b>	Moderately Mounded — mounds are 0.3 m. - 1 m. high and 3 - 7 m. apart
<b>ST</b>	Strongly Mounded — mounds are 0.3 m. - 1 m. high and 1-3 m. apart
<b>SE</b>	Severely Mounded — mounds are 0.3 m. - 1 m. high and 0.3 - 1 m. apart
<b>EX</b>	Extremely Mounded — mounds are > 1 m. high and > 3 m. apart
<b>UL</b>	Ultra Mounded — mounds are > 1 m. high and < 3 m. apart

## FIELD 8-4 Slope Position - **Position**

Slope position for the point is determined by **macrosite**. As an example, record the point as falling on the UPPER one-third of the slope when the point falls on the upper part of a long mountain side slope even if the point is located on the toeslope of a small escarpment or break in slope.

CODE	DESCRIPTION	CODE	DESCRIPTION
<b>1</b>	LOWER one-third	<b>5</b>	SADDLE
<b>2</b>	MIDDLE one-third	<b>6</b>	DRAINAGE, small
<b>3</b>	UPPER one-third	<b>7</b>	VALLEY, narrow bottom
<b>4</b>	RIDGETOP	<b>8</b>	FLAT, <5% slope

## FIELD 8-5 Rooting Depth - **RootDpth**

Measured from the surface to a maximum depth of 80% of the live roots.

CODE	DESCRIPTION
<b>1 to 50</b>	Depth, in cm., to 80% of live root depth.
<b>99</b>	Not Applicable

## FIELD 8-6 Depth To Bottom Of Live Moss - **MossDpth**

The live moss includes all living green mosses, lichens, and liverworts. Depth is measured from the surface to the either dead fibrous materials, decomposed organics, or mineral soil, depending on which occurs first. (Some of the organic materials listed above may be absent in a profile).

CODE	DESCRIPTION
<b>1 to 50</b>	Depth, in cm., to bottom of live moss
<b>99</b>	Not Applicable

### **FIELD 8-7 Depth To Bottom Of Slightly Decomposed Oi (Fibric) Organic Material - FibricDpth**

The Fibric organic materials are composed of dead mosses, lichens, grasses and decomposing twigs and wood debris. The materials retain a fiber content of >75% after being rubbed 10 times between the thumb and fingers.

CODE	DESCRIPTION
------	-------------

<b>1 to 50</b>	Depth, in cm., to bottom of fibric layer as measured from the <b>bottom</b> of live moss.
----------------	---

<b>99</b>	Not Applicable
-----------	----------------

### **FIELD 8-8 Depth To Bottom Of Moderately Decomposed Oe (Hemic) Organic Material - HemicDpth**

The Hemic organic materials will have 17% - 75% visible fibers by volume after being rubbed 10 times.

CODE	DESCRIPTION
------	-------------

<b>1 To 50</b>	Depth, in cm., to bottom of the hemic layer as measured from the <b>bottom</b> of live moss.
----------------	--

<b>99</b>	Not Applicable
-----------	----------------

## **FIELD 8-9 Depth To Bottom Of Highly Decomposed Oa (Sapric) Organic Material - SapricDpth**

The sapric organic material is highly decomposed with less than 17% visible fiber content by volume. It is dark and fingers are often stained from the organics. NOTE: It is sometimes difficult to determine the boundary between the decomposed organic materials and mineral soil that has much organics incorporated into it at the surface. A mineral soil must have < 20% organic matter by weight.

CODE	DESCRIPTION
------	-------------

<b>1 to 50</b>	Depth, in cm, to bottom of the hemic layer as measured from the <b>bottom</b> of live moss.
----------------	---

<b>99</b>	Not Applicable
-----------	----------------



## APPENDIX A

### MVT Level IV Reference

The **Quick Reference Level IV List** of vegetation/land cover types for the Coastal Alaska Grid Inventory was adapted from *The 1991 Revision of the Alaska Vegetation Classification* by Viereck, Dyrness, Batten, and Wenzlick. It is only intended for field use as a primary step to identifying the Main Vegetation Type (MVT) on the Polygon Record.

Using this list, find the Level IV vegetation type (ex. 1A2C). For each vegetation type, there is a Level V section number that corresponds to the sections in the Level V list (**Appendix B**). Once you have found the Level IV call **and** its corresponding Level V list number, go to **Appendix B** to determine the Level V call.

You should check your MVT call when you return to camp (see Viereck, Dyrness, Batten, and Wenzlick, 1991, for detailed descriptions of vegetation types, including their usual sites and associated understory species). Also, talk it over with your colleagues, field supervisor, etc., in the field or at camp if you are having problems classifying a polygon type.

### Quick Reference List

#### 1A1 CLOSED NEEDLELEAF FOREST (60-100% CANOPY)

	<b>Level 5 List</b>
A. Sitka spruce	1
B. Western hemlock	2
C. Sitka spruce-western hemlock	3
D. Western hemlock-Sitka spruce (western redcedar) LCT = 40	3
Western hemlock-Sitka spruce (western redcedar) LCT = 48	12
E. Western hemlock-Alaska cedar	4
F. Mountain hemlock	5
G. Western hemlock - western redcedar	6
H. Silver fir - western hemlock	7
I. Subalpine fir	8
J. White spruce	9
K. Black spruce	10
L. Black spruce-white spruce	11
U. Mixed conifer	12
V. Black spruce-tamarack	13
W. Lodgepole pine	14

## 1A2 OPEN NEEDLELEAF FOREST (25-59% CANOPY)

	<b>Level 5 List #</b>
A. Sitka spruce	1
B. Western hemlock-Sitka spruce	3
C. Mountain hemlock	5
D. Mixed conifer	12
E. White spruce	9
F. Black spruce	10
G. Black spruce-white spruce	11
H. Black spruce-tamarack	13
M. Western hemlock	2
N. Sitka spruce-western hemlock	3
P. Western hemlock-Alaska cedar	4
R. Western hemlock-western red cedar	6
S. Silver fir-western hemlock	7
T. Subalpine fir	8
W. Lodgepole pine	14

## 1A3 WOODLAND NEEDLELEAF FOREST (10-24% CANOPY)

	<b>Level 5 List #</b>
A. Lodgepole pine	14
B. Sitka spruce	1
C. White spruce	9
D. Black spruce	10
E. Black spruce-white spruce	11
M. Western hemlock	2
N. Sitka spruce-western hemlock	3
O. Western hemlock-Sitka spruce	3
P. Western hemlock-Alaska cedar	4
Q. mountain hemlock	5
R. Western hemlock-western red cedar	6
S. Silver fir-western hemlock	7
T. Subalpine fir	8
U. Mixed conifer	12
V. Black spruce-tamarack	13

## 1B1 CLOSED BROADLEAF FOREST (60-100% CANOPY)

	<b>Level 5 List #</b>
A. Red alder	15
B. Black cottonwood	16
D. Paper birch	18
F. Paper birch-quaking aspen	20
M. Paper birch-balsam poplar	22

1B2 OPEN BROADLEAF FOREST (25-59% CANOPY)

	<b>Level 5 List #</b>
A. Paper birch	18
H. Red alder	15
I. Black cottonwood	16
K. Paper birch-aspen	20
M. Paper birch-balsam poplar	22

1B3 WOODLAND BROADLEAF FOREST (10-24% CANOPY)

	<b>Level 5 List #</b>
A. Paper birch	18
C. Paper birch- balsam poplar	22
H. Red alder	15
I. Black cottonwood	16
K. Paper birch-aspen	20

1C1 CLOSED MIXED FOREST (60-100% CANOPY)

	<b>Level 5 List #</b>
A. Spruce-paper birch	23
B. White spruce-paper birch-balsam poplar (black cottonwood)	24
C. Spruce-paper birch-quaking aspen	24
D. Quaking aspen-spruce	25
E. Balsam poplar-white spruce	26

1C2 OPEN MIXED FOREST (25-59% CANOPY)

	<b>Level 5 List #</b>
A. Spruce-paper birch	23
B. Quaking Aspen-spruce	25
C. Paper birch-balsam poplar (blk cottonwood)-spruce	24
D. Spruce-balsam poplar	26
F. Spruce-paper birch-aspen	24

1C3 WOODLAND MIXED FOREST (10-24% canopy)

	<b>Level 5 List #</b>
A. Spruce-paper birch	23
F. Spruce-paper birch-aspen	24
G. Quaking aspen-spruce	25
H. Balsam poplar-spruce	26
I. Spruce-paper birch-poplar (blk cottonwood)	24

2A1 CLOSED DWARF TREE FOREST (60-100% canopy, trees $\leq$ 3 m)		
	<b>Level 5 List #</b>	
A. Mountain hemlock		27
B. Subalpine fir		28
M Mixed Conifer		12
P Lodgepole Pine		14
Y. Black spruce		29
2A2 OPEN DWARF TREE FOREST (25-59% canopy, trees $\leq$ 3 m tall)		
	<b>Level 5 List #</b>	
A. Black spruce		29
B. Mountain hemlock		27
M Mixed Conifer		12
P Lodgepole Pine		14
T. Subalpine fir		28
2A3 WOODLAND DWARF TREE FOREST (10-24% canopy, trees $\leq$ 3 m tall)		
	<b>Level 5 List #</b>	
A. Black spruce		29
M Mixed Conifer		12
P Lodgepole Pine		14
Q. Mountain hemlock		27
T. Subalpine fir		28
2B1 CLOSED TALL SCRUB (76-100% cover, shrubs $>$ 1.5 m tall)		
	<b>Level 5 List #</b>	
A. Willow		30
B. Alder		31
C. Shrub birch		32
D. Alder-willow		33
E. Shrub birch-willow		34
F. Shrub swamp (willow)		30
Shrub swamp (alder)		31
G. Salmonberry		35
H. Alder -salmonberry		36
I. Blueberry - salmonberry		37
2B2 OPEN TALL SCRUB (25-75% cover, shrubs $>$ 1.5 m tall)		
	<b>Level 5 List #</b>	
A. Willow		30
B. Alder		31
C. Shrub birch		32
D. Alder-willow		33
E. Shrub birch-willow		34
F. Shrub swamp		31
G. Salmonberry		35
H. Alder -salmonberry		36
I. Blueberry - salmonberry		37

2C1 CLOSED LOW SCRUB (76-100% cover, $0.2\text{ m} \leq \text{shrubs} \leq 1.5\text{ m}$ tall)	
	<b>Level 5 List #</b>
A. Shrub birch	38
B. Low willow	37
C. Shrub birch-willow	40
D. Ericaceous shrub	41
E. Low alder-willow	42
O. Willow-graminoid shrub-bog	46
P. Alder	48
Q. Shrub birch-ericaceous shrub	44
R. Mixed shrub-sedge tussock	43
T. Willow-sedge shrub tundra	45
U. Sweetgale-graminoid bog	47
V. Copperbush - blueberry	51
W. Copperbush - salmonberry	52
Y. Copperbush	53
Z. Salmonberry - blueberry	54

2C2 OPEN LOW SCRUB (25-75% cover, $0.2\text{ m} \leq \text{shrubs} \leq 1.5\text{ m}$ tall)	
	<b>Level 5 List #</b>
A. Mixed shrub-sedge tussock tundra	43
B. Mixed shrub-sedge tussock bog	43
C. Mesic shrub birch-ericaceous shrub	44
D. Shrub birch-ericaceous shrub bog	44
E. Ericaceous shrub bog	41
F. Shrub birch-willow	40
G. Willow	39
H. Willow-sedge shrub tundra	45
I. Willow-graminoid shrub bog	46
J. Sweetgale-graminoid bog	47
K. Low alder-willow	42
L. Low alder	48
M. Sagebrush-juniper	49
N. Sagebrush-grass	50
S. Shrub birch	38
V. Copperbush - blueberry	51
W. Copperbush - salmonberry	52
Y. Copperbush	53
Z. Salmonberry - blueberry	54

2D1 DRYAS DWARF SCRUB (shrubs $< 0.2\text{ m}$ tall)	
	<b>Level 5 List #</b>
A. Dryas tundra	55
B. Dryas-sedge tundra	55
C. Dryas-lichen tundra	55

2D2 ERICACEOUS DWARF SCRUB (shrubs < 0.2 m tall)

	<b>Level 5 List #</b>
A. Bearberry tundra	56
B. Vaccinium tundra	57
C. Crowberry tundra	58
D. Mountain-heath tundra	59
E. Cassiope tundra	60

2D3 WILLOW DWARF SCRUB (shrubs < 0.2 m tall)

	<b>Level 5 List #</b>
A. Willow tundra	61

3A1 DRY GRAMINOID HERBACEOUS

	<b>Level 5 List #</b>
A. Elymus	62
B. Dry fescue	63
C. Midgrass-shrub	64
D. Midgrass-herb	65
E. Hairgrass	66

3A2 MESIC GRAMINOID HERBACEOUS

	<b>Level 5 List #</b>
A. Bluejoint meadow	67
B. Bluejoint-herb	68
C. Bluejoint- shrub	69
D. Tussock tundra	70
E. Mesic sedge-grass meadow tundra	71
F. Mesic sedge-herb meadow tundra	72
G. Mesic grass-herb meadow tundra	65
H. Sedge-willow tundra	73
I. Sedge-birch tundra	74
J. Sedge-dryas tundra	75

### 3A3 WET GRAMINOID HERBACEOUS

	<b>Level 5 List #</b>
A. Wet sedge meadow tundra	70
B. Wet sedge-grass meadow tundra	71
C. Wet sedge-herb meadow tundra	72
D. Fresh sedge marsh	70
E. Fresh grass marsh ( <i>Arctophila fluva</i> )	79
Fresh grass marsh (other species dominate))	71
F. Subarctic lowland sedge wet meadow	70
G. Subarctic lowland sedge-shrub wet meadow	73
H. Halophytic grass wet meadow	76
I. Halophytic sedge wet meadow	70
J. Subarctic lowland sedge bog meadow	70
K. Subarctic lowland sedge-moss bog meadow	78

### 3B1 DRY FORB HERBACEOUS (Herbaceous tundra)

	<b>Level 5 List #</b>
A. Seral herbs	80
B. Alpine herb-sedge (snowbed)	81
C. Alpine herbs	82

### 3B2 MESIC FORB HERBACEOUS (Subarctic herbs)

	<b>Level 5 List #</b>
A. Mixed herbs	83
B. Fireweed	84
C. Large umbel	85
D. Ferns	86

### 3B3 WET FORB HERBACEOUS (wetland herbs)

	<b>Level 5 List #</b>
A. Fresh herb marsh	87
B. Subarctic lowland herb wet meadow	87
C. Subarctic lowland herb bog meadow	87
D. Halophytic herb wet meadow	88

### 3C1 MOSS BRYOID HERBACEOUS

	<b>Level 5 List #</b>
A. Wet bryophyte	89
B. Dry bryophyte	89

### 3C2 LICHEN BRYOID HERBACEOUS

	<b>Level 5 List #</b>
A. Crustose lichen	90
B. Foliose and fruticose lichen	90

### 3D1 FRESHWATER AQUATIC HERBACEOUS

	<b>Level 5 List #</b>
A. Pond lily	91
B. Common maretail	92
C. Aquatic buttercup	93
D. Burreed	94
E. Water milfoil	95
F. Fresh pondweed	96
G. Water star-wort	97
H. Cryptogam	86

### 3D2 BRACKISH WATER AQUATIC HERBACEOUS

	<b>Level 5 List #</b>
A. Four-leaf maretail	92
B. Brackish pondweed	96

### 3D3 MARINE AQUATIC HERBACEOUS

	<b>Level 5 List #</b>
A. Eelgrass	98
B. Marine algae	99

### 7 BARREN

#### A "Permanent Ice & Snow"

1. Snow/ice field
2. Glacier
3. Aufeis (overflow ice)

#### B. Rock

1. Felsenmeer (broken boulder field)
2. Solid outcrop
3. Scree; talus slopes
4. Other; including bare soil and eroded gullies

#### C. Mud

1. Tidal flat
2. Lake bottom

#### D. Alluvial Deposits

1. Fluvial deposits
2. Glacial outwash

#### E. Sand

1. Dunes
2. Beaches

#### F. Other

1. Agricultural lands
2. Recent burns
3. Cultural; roads, paved areas, buildings, etc.
4. Flooded (permanently), formerly vegetated



8 WATER

A. Streams/rivers/canals

1. Census More than 200 m (1/8 mile or 660 ft wide)
2. Non-census Less than 200 m wide

B. Lakes/ponds

1. Census Greater than 8 ha (40 acres)
2. Non-census Less than 8 ha

C. Reservoirs

D. Bays & estuaries

**\*\*Note:** Where rivers or canals enter bays or estuaries the river/canal will terminate where its width exceeds 1 nautical mile.

SECT	NAME	L5	DESCRIPTION
1	1A1A		Closed needleleaf forest Sitka Spruce
	1A2A		Open needleleaf forest Sitka spruce
	1A3B		Woodland needleleaf forest Sitka spruce
		01	Picea sitchensis/Oplopanax horridus- Rubus spectabilis/Cornus canadensis
		02	Picea sitchensis/Oplopanax horridus/ Lysichiton americanum
		03	Picea sitchensis/Oplopanax horridus/ Circaea alpina
		04	Picea sitchensis/Calamagrostis nutkaensis
		05	Picea sitchensis/Rubus spectabilis
		06	Picea sitchensis/Alnus sinuata/ Calamagrostis canadensis
		07	Picea sitchensis/Alnus spp.
		08	Picea sitchensis/Vaccinium uliginosum- Trichophorum caespitosum/Sphagnum fuscum-S. papillosum
2		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (Describe type in Polygon Notes)
	1A1B		Closed needleleaf forest Western Hemlock
	1A2M		Open needleleaf forest Western Hemlock
	1A3M		Woodland needleleaf forest Western Hemlock
		01	Tsuga heterophylla/Vaccinium spp.
		02	Tsuga heterophylla/Vaccinium spp./ Dryopteris dilatata
		03	Tsuga heterophylla/Vaccinium spp.- Oplopanax horridus
		04	Tsuga heterophylla/Oplopanax horridus
		05	Tsuga heterophylla/Oplopanax horridus/ Polystichum munitum
		06	Tsuga heterophylla/Oplopanax horridus/ Lysichiton americanum
3		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	1A1C		Closed needleleaf forest Sitka spruce-western hemlock
	1A1D		Closed needleleaf forest western hemlock-sitka spruce
	1A2B		Open needleleaf forest western hemlock-sitka spruce
	1A2N		Open needleleaf forest Sitka spruce-western hemlock
	1A2O		Open needleleaf forest western hemlock-Sitka spruce
	1A3N		Woodland needleleaf forest Sitka spruce-western hemlock
	1A3O		Woodland needleleaf forest western hemlock-sitka spruce
		01	Picea sitchensis-Tsuga heterophylla/ Lysichiton americanum/Sphagnum spp.
		02	Picea sitchensis-Tsuga heterophylla/ Vaccinium spp.-Menziesiaferruginea
		03	Picea sitchensis-(Tsuga heterophylla)/ Oplopanax horridus/Lysichiton americanum
		04	Picea sitchensis-(Tsuga heterophylla)/ Vaccinium spp./Oplopanax horridus

SECT	NAME	L5	DESCRIPTION
		05	Picea sitchensis-(Tsuga heterophylla)/ Vaccinium spp.
		06	Picea sitchensis-(Tsuga heterophylla)/ Vaccinium spp./Lysichiton americanum
		07	Tsuga heterophylla-(Picea sitchensis)/ Vaccinium spp./Oplopanax horridus
		08	Tsuga heterophylla-(Picea sitchensis)/ Vaccinium spp./Lysichiton americanum
		09	Tsuga heterophylla-(Picea sitchensis)/Oplopanax horridus/ Lysichiton americanus
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1E</b>		Closed needleleaf forest Western hemlock-Alaska-cedar
<b>4</b>	<b>1A2P</b>		Open needleleaf forest Western hemlock-Alaska-cedar
	<b>1A3P</b>		Woodland needleleaf forest Western hemlock-Alaska-cedar
		01	Tsuga heterophylla-Chamaecyparis nootkatensis/Vaccinium spp.
		02	Tsuga heterophylla-Chamaecyparis nootkatensis/Vaccinium Lysichiton americanum
		03	Tsuga heterophylla-Chamaecyparis nootkatensis/Vaccinium spp./Oplopanax horridus
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1F</b>		Closed needleleaf forest Mountain hemlock
<b>5</b>	<b>1A2C</b>		Open needleleaf forest Mountain hemlock
	<b>1A3Q</b>		Woodland needleleaf forest Mountain hemlock
		01	Tsuga mertensiana/Vaccinium spp.
		02	Tsuga mertensiana/Vaccinium spp.- Cassiope mertensiana
		03	Tsuga mertensiana/Vaccinium spp.- Cladothamnus pyrolaeiflorus/Fauria crista-galli
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1G</b>		Closed needleleaf forest Western hemlock-western redcedar
<b>6</b>	<b>1A2R</b>		Open needleleaf forest Western hemlock-western redcedar
	<b>1A3R</b>		Woodland needleleaf forest Western hemlock-western redcedar
		01	Tsuga heterophylla-Thuja plicata/ Vaccinium spp.-Lysichiton americanum
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1H</b>		Closed needleleaf forest Silver fir-western hemlock
<b>7</b>	<b>1A2S</b>		Open needleleaf forest Silver fir-western hemlock
	<b>1A3S</b>		Woodland needleleaf forest Silver fir-western hemlock
		01	Abies amabilis-Tsuga heterophylla
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1I</b>		Closed needleleaf forest Subalpine fir

SECT	NAME	L5	DESCRIPTION
8	1A2T		Open needleleaf forest Subalpine fir
	1A3T		Woodland needleleaf forest Subalpine fir
		01	Abies lasiocarpa-Tsuga mertensiana
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
9	1A1J		Closed needleleaf forest White spruce
	1A2E		Open needleleaf forest White spruce
	1A3C		Woodland needleleaf forest White spruce
		01	Picea glauca/feathermosses
		02	Picea glauca/Alnus tenuifolia/ Hylocomium splendens
		03	Picea glauca/Viburnum edule/Equisetum arvense
		04	Picea glauca/Linnaea borealis- Equisetum sylvaticum
		05	Picea glauca/Rosa acicularis/Linnaea borealis/Hylocomium splendens
		06	Picea glauca/Rosa acicularis- Shepherdia canadensis/Linnaea borealis
		07	Picea glauca/Alnus spp./Arctostaphylos uva-ursi spp.
		08	Picea glauca/Mertensia spp./Gramineae spp.
		09	Picea glauca/Salix spp./Shepherdia canadensis/Arctostaphylos spp./ Peltigera spp.
		10	Picea glauca/Rosa acicularis/Equisetum spp.
		11	Picea glauca/Shepherdia canadensis/ Equisetum spp.-Arctostaphylos spp.
		12	Picea glauca/Alnus crispa/Rosa acicularis/Arctostaphylos rubra
		13	Picea glauca/Rosa acicularis- Shepherdia canadensis/Arctostaphylos rubra-Linnaea borealis
		15	Picea glauca/Alnus crispa-A. tenuifolia/Vaccinium vitis-idaea/Hylocomium splendens
		16	Picea glauca/Alnus tenuifolia/ Calamagrostis canadensis-Vaccinium vitis-idaea
		17	Picea glauca/Betula glandulosa/ Hylocomium splendens
		18	Picea glauca/Betula glandulosa/ Sphagnum spp.
		19	Picea glauca/Salix bebbiana/Rosa acicularis/Equisetum spp.- Epilobium spp./lichen
		20	Picea glauca/Salix spp./Shepherdia canadensis/Vaccinium vitis-idaea
		20	Picea glauca/Salix spp./Ledum decumbens/Vaccinium vitis-idaea
		22	Picea glauca/Alnus crispa-Salix spp./ Equisetum arvense
		23	Picea glauca/Vaccinium spp.-Salix spp./Equisetum arvense
		24	Picea glauca/Salix spp./Equisetum arvense
		25	Picea glauca/Salix spp./feathermosses
		27	Picea glauca/Alnus crispa/ feathermosses
		28	Picea glauca/Alnus crispa-Salix spp./ Vaccinium uliginosum/feathermosses
		29	Picea glauca/Betula nana-Vaccinium uliginosum/feathermosses
		30	Picea glauca/Betula glandulosa/ feathermosses-Cladonia spp.

SECT	NAME	L5	DESCRIPTION
		31	Picea glauca/Dryas spp.-moss
		32	Picea glauca/Cladonia spp.
		33	Picea glauca/Salix lanata/Cladonia spp.
		34	Picea glauca/Ledum groenlandicum- Vaccinium
		35	Picea glauca/Alnus tenuifolia/ Arctostaphylos uva-ursi/lichen
		36	Picea glauca/Dryas octopetala-Salix reticulata-Empetrum nigrum
		40	Picea glauca/Vaccinium spp./Equisetum arvense
		41	Picea glauca/Vaccinium spp.-Empetrum nigrum
		42	Picea glauca/Salix alaxensis-S. glauca-S. lanata/Carex scirpoidea
		45	Picea glauca/Vaccinium uliginosum- Carex bigelowii
		46	Picea glauca/Ledum groenlandicum- Vaccinium vitis-idaea/feathermoss
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1K</b>		Closed needleleaf forest Black spruce
<b>10</b>	<b>1A2F</b>		Open needleleaf forest Black spruce
	<b>1A3D</b>		Woodland needleleaf forest Black spruce
		01	Picea mariana/feathermosses
		02	Picea mariana/Rosa acicularis/ Peltigera spp.
		03	Picea mariana/Ledum decumbens/ Vaccinium vitis-idaea/Cladonia spp.
		04	Picea mariana/Rosa acicularis/ Equisetum spp./Cladonia rangiferina
		05	Picea mariana/Vaccinium spp./ feathermosses
		06	Picea mariana/Ledum groenlandicum/ Hylocomium splendens
		07	Picea mariana/feathermosses-Cladonia spp.
		08	Picea mariana/Betula glandulosa-Ledum decumbens/Sphagnum spp.
		09	Picea mariana/Alnus tenuifolia-Betula nana-Ledum decumbens/Sphagnum spp.
		10	Picea mariana/Arctostaphylos rubra- Empetrum nigrum/Cladonia spp.
		11	Picea mariana/Betula nana-Potentilla fruticosa/Carex spp.
		12	Picea mariana/Betula nana-Carex spp
		13	Picea mariana/Alnus crispa/Betula nana/Vaccinium spp./Cladonia spp.
		14	Picea mariana/Vaccinium uliginosum/ Empetrum nigrum/lichen
		15	Picea mariana/Vaccinium uliginosum/ Arctostaphylos rubra/Dicranum spp.
		16	Picea mariana/Salix spp./Potentilla fruticosa/Arctostaphylos rubra/ Peltigera spp.
		17	Picea mariana/Betula glandulosa/ feathermosses
		18	Picea mariana/Sphagnum spp.-Cladonia spp.
		19	Picea mariana/Cladonia spp.
		20	Picea mariana/Vaccinium spp.-Salix spp./Sphagnum spp.

SECT	NAME	L5	DESCRIPTION
		21	Picea mariana/Betula nana/Eriophorum spp./Sphagnum spp.
		22	Picea mariana/Salix spp./Hylocomium splendens-Cladonia rangiferina
		23	Picea mariana/Eriophorum vaginatum
		24	Picea mariana/Ledum decumbens/ Vaccinium spp.
		25	Picea mariana/Sphagnum spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1L</b>		Closed needleleaf forest Black spruce-white spruce
<b>11</b>	<b>1A2G</b>		Open needleleaf forest Black spruce-White spruce
	<b>1A3E</b>		Woodland needleleaf forest Black spruce-White spruce
		01	Picea mariana-P. glauca/feathermosses
		02	Picea glauca-P. mariana/Salix spp./ Arctostaphylos spp.
		03	Picea glauca-P. mariana/Salix spp./ Vaccinium vitis-idaea/Hylocomium splendens
		04	Picea glauca-P. mariana/Salix spp./ Vaccinium vitis-idaea/lichen
		05	Picea mariana-P. glauca/Salix spp./ Ledum decumbens/Empetrum nigrum
		06	Picea mariana-P. glauca/Salix spp./ Potentilla fruticosa/Rubus arcticus- Arctostaphylos spp.
		07	Picea glauca-P. mariana/Ledum groenlandicum-Vaccinium vitis- idaea/ Pleurozium schreberi
		08	Picea mariana-P. glauca/Betula glandulosa
		09	Picea glauca-P. mariana/Vaccinium uliginosum/Arctostaphylos rubra/ Dicranum spp.
		10	Picea mariana-P. glauca/Betula nana/ Arctostaphylos rubra-Vaccinium uliginosum
		11	Picea mariana-P. glauca/Ledum decumbens/Petasites spp./Dicranum spp.
		12	Picea mariana-P. glauca/Shepherdia canadensis/Epilobium spp./Peltigera spp.
		13	Picea glauca-P. mariana/Vaccinium uliginosum-Carex bigelowii
		14	Picea mariana-P. glauca/Rubus chamaemorus-Ledum decumbens-Vaccinium spp.
		15	Picea mariana-P. glauca/Betula glandulosa/feathermosses
		16	Picea glauca-P. mariana/lichen
		17	Picea mariana-P. glauca/Alnus crispa- Betula glandulosa/Pleurozium schreberi
		18	Picea mariana-P. glauca/Rubus chamaemorus-Ledum decumbens-Vaccinium spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1U</b>		Closed needleleaf forest Mixed conifer
<b>12</b>	<b>1A1D</b>		Western hemlock-Sitka spruce-(western red cedar)
	<b>1A2D</b>		Open needleleaf forest Mixed conifer
	<b>1A3U</b>		Woodland needleleaf forest Mixed conifer
	<b>2A1M</b>		Closed dwarf tree forest Mixed conifer
	<b>2A2M</b>		Open dwarf tree forest Mixed conifer

SECT	NAME	L5	DESCRIPTION
	<b>2A3M</b>		Woodland dwarf tree forest Mixed conifer
		01	Tsuga heterophylla-Picea sitchensis- (Thuja plicata)/Vaccinium spp./ Rhytidiadelphus loreus
		02	Tsuga heterophylla-Picea sitchensis- (Thuja plicata)/Lysichiton americanum/ Sphagnum recurvum
		03	Tsuga heterophylla-Chamaecyparis nootkatensis-Tsuga mertensiana/Picea sitchensis/Vaccinium spp./Lysichiton americanum
		04	Tsuga heterophylla-Chamaecyparis nootkatensis-Tsuga mertensiana-Picea sitchensis/Lysichiton americanum/ Athyrium
		05	Chamaecyparis nootkatensis-Tsuga mertensiana-Tsuga heterophylla-Picea sitchensis-Pinus contorta/Vaccinium spp./Fauria
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1V</b>		Closed needleleaf forest Black spruce-Tamarack
<b>13</b>	<b>1A2H</b>		Open needleleaf forest Black spruce-Tamarack
	<b>1A3V</b>		Woodland needleleaf forest Black spruce-Tamarack
		01	Picea mariana-Larix laricina (undescribed)
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1A1W</b>		Closed needleleaf forest Lodgepole pine
<b>14</b>	<b>1A2W</b>		Open needleleaf forest Lodgepole pine
	<b>1A3A</b>		Woodland needleleaf forest Lodgepole pine
	<b>2A1P</b>		Closed dwarf tree forest Lodgepole pine
	<b>2A2P</b>		Open dwarf tree forest Lodgepole pine
	<b>2A3P</b>		Woodland dwarf tree forest Lodgepole pine
		01	Pinus contorta/Empetrum nigrum
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1B1A</b>		Closed broadleaf forest Red alder
<b>15</b>	<b>1B2H</b>		Open broadleaf forest Red alder
	<b>1B3H</b>		Woodland broadleaf forest Red alder
		01	Alnus rubra
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1B1B</b>		Closed broadleaf forest Black cottonwood
<b>16</b>	<b>1B2I</b>		Open broadleaf forest Black cottonwood
	<b>1B3I</b>		Woodland broadleaf forest Black cottonwood
		01	Populus trichocarpa (undescribed)

SECT	NAME	L5	DESCRIPTION
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1B1C</b>		Closed broadleaf forest Balsam poplar
<b>17</b>	<b>1B2C</b>		Open broadleaf forest Balsam poplar
	<b>1B3B</b>		Woodland broadleaf forest Balsam poplar
		01	Populus balsamifera/Alnus tenuifolia/ Calamagrostis canadensis
		02	Populus balsamifera/Alnus tenuifolia/ Rosa acicularis/Equisetum spp.
		03	Populus balsamifera/Salix barclayi/ Heracleum lanatum
		04	Populus balsamifera/Salix spp./herb
		05	Populus balsamifera/Alnus spp.-Salix spp./Rosa acicularis/Equisetum spp.
		06	Populus balsamifera/Rosa acicularis/ Equisetum spp.-Pyrola spp.
		07	Populus balsamifera/Arctostaphylos uva-ursi/Peltigera spp.
		08	Populus balsamifera/Salix spp.-Alnus spp./Calamagrostis spp.
		09	Populus balsamifera/Salix hastata- Shepherdia canadensis-Epilobium angustifolium/Hylocomium splendens-
		10	Populus balsamifera/Alnus tenuifolia/ Equisetum spp.
		11	Populus balsamifera
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1B1D</b>		Closed broadleaf forest Paper birch
<b>18</b>	<b>1B2A</b>		Open broadleaf forest Paper birch
	<b>1B3A</b>		Woodland broadleaf forest Paper birch
		01	Betula papyrifera/Alnus crispa/ Calamagrostis spp.
		02	Betula papyrifera/Viburnum edule
		03	Betula papyrifera/Alnus spp.-Salix spp.
		04	Betula papyrifera/Ledum groenlandicum/ Pleurozium schreberi-Polytrichum juniperinum
		05	Betula papyrifera/Cladonia spp.
		06	Betula papyrifera/Betula glandulosa/ Hylocomium spp.
		07	Betula papyrifera/Viburnum edule/ Calamagrostis spp.
		08	Betula papyrifera/Alnus crispa/Ledum groenlandicum
		09	Betula papyrifera/Cladonia spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>1B1E</b>		Closed broadleaf forest Quaking aspen
<b>19</b>	<b>1B2B</b>		Open broadleaf forest Quaking aspen
	<b>1B3J</b>		Woodland broadleaf forest Quaking aspen
		01	Populus tremuloides/Viburnum edule/ Linnaea borealis



SECT	NAME	L5	DESCRIPTION
		02	Populus tremuloides/Salix spp./ Arctostaphylos uva-ursi
		03	Populus tremuloides/Salix spp./ Drepanocladus spp.
		04	Populus tremuloides/Salix spp./ Arctostaphylos uva-ursi/Gramineae spp.
		05	Populus tremuloides/Salix spp./ Arctostaphylos uva-ursi/Epilobium spp.
		06	Populus tremuloides/Elaeagnus commutata-Shepherdia canadensis/ Arctostaphylos spp./lichen
		07	Populus tremuloides/Shepherdia canadensis/Calamagrostis purpurascens
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
20	1B1F		Closed broadleaf forest Paper birch-quaking aspen
	1B2K		Open broadleaf forest Paper birch-quaking aspen
	1B3K		Woodland broadleaf forest Paper birch-quaking aspen
		01	Populus tremuloides-Betula papyifera/Rosa acicularis/ Arctostaphylos uva-ursi/lichen
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
21	1B1G		Closed broadleaf forest Quaking aspen-balsam poplar
	1B2L		Open broadleaf forest Quaking aspen-balsam poplar
	1B3L		Woodland broadleaf forest Quaking aspen-balsam poplar
		01	Populus tremuloides-P. balsamifera/ Rosa acicularis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
22	1B1M		Closed broadleaf forest Paper birch-balsam poplar
	1B2M		Open broadleaf forest Paper birch-balsam poplar
	1B3C		Woodland broadleaf forest Paper birch-balsam poplar
		01	Betula papyrifera-Populus balsamifera
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
23	1C1A		Closed mixed forest Spruce paper birch
	1C2A		Open mixed forest Spruce-paper birch
	1C3A		Woodland mixed forest Spruce-paper birch
		01	Picea glauca-Betula papyrifera/Alnus crispa/Calamagrostis canadensis
		02	Picea mariana-Betula papyrifera/Alnus crispa/Hylocomium splendens
		03	Picea mariana-Betula papyrifera/Ledum spp. (undescribed)
		04	Betula papyrifera-Picea glauca-P. mariana/Calamagrostis spp.
		05	Picea glauca-Betula papyrifera/Alnus spp.-Salix spp./Galium boreale
		06	Picea glauca-Betula papyrifera/Alnus crispa/Ledum groenlandicum
		07	Picea mariana-Betula papyrifera/ Arctostaphylos uva-ursi/lichen

SECT	NAME	L5	DESCRIPTION
		08	<i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Ledum decumbens</i> / <i>Vaccinium vitis-idaea</i>
		09	<i>Picea glauca</i> - <i>Betula papyrifera</i> / <i>Calamagrostis canadensis</i> - <i>Hylocomium splendens</i>
		10	<i>Picea glauca</i> - <i>Betula papyrifera</i> / <i>Alnus crispa</i> / <i>Sphagnum</i> spp.
		11	<i>Picea glauca</i> - <i>Betula papyrifera</i> / <i>Salix planifolia</i> / <i>Sphagnum</i> spp.
		12	<i>Picea mariana</i> - <i>Betula papyrifera</i> / <i>Cladonia</i> spp. (undescribed)
		13	<i>Picea mariana</i> - <i>Betula papyrifera</i> 11
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
24	1C1B		Closed mixed forest White spruce-paper birch-balsam poplar
	1C1C		Closed mixed forest Spruce paper birch-quaking aspen
	1C2C		Open mixed forest Paper birch-balsam poplar-spruce
	1C2F		Open mixed forest Spruce paper birch-quaking aspen
	1C3I		Woodland mixed forest White spruce-paper birch-balsam poplar/aspen
	1C3F		Woodland mixed forest Spruce paper birch-quaking aspen
		01	<i>Picea glauca</i> - <i>Betula papyrifera</i> - <i>Populus balsamifera</i> ( <i>trichocarpa</i> )
		02	<i>Picea mariana</i> - <i>Betula papyrifera</i> - <i>Populus tremuloides</i> / <i>Ledum groenlandicum</i>
		03	<i>Betula papyrifera</i> - <i>Populus balsamifera</i> - <i>Picea glauca</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
25	1C1D		Closed mixed forest Quaking aspen-spruce
	1C2B		Open mixed forest Quaking aspen-spruce
	1C3G		Woodland mixed forest Quaking aspen-spruce
		01	<i>Populus tremuloides</i> - <i>Picea glauca</i> / <i>Arctostaphylos uva-ursi</i>
		02	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Ledum</i> spp.
		03	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Cornus canadensis</i>
		04	<i>Populus tremuloides</i> - <i>Picea glauca</i> / <i>Salix</i> spp./ <i>Epilobium</i> spp.
		05	<i>Populus tremuloides</i> - <i>Picea glauca</i> / <i>Salix</i> spp./ <i>Arctostaphylos uva-ursi</i>
		06	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Salix</i> spp./ <i>Rosa acicularis</i> / <i>Equisetum</i> spp.
		07	<i>Populus tremuloides</i> - <i>Picea mariana</i> / <i>Vaccinium uliginosum</i> / <i>Polytrichum</i> spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
26	1C1E		Closed mixed forest Balsam poplar-white spruce
	1C2D		Open mixed forest Spruce-balsam poplar
	1C3H		Woodland mixed forest Spruce-balsam poplar
		01	<i>Populus balsamifera</i> - <i>Picea glauca</i> / <i>Alnus</i> spp./ <i>Oplopanax horridus</i>
		02	<i>Populus balsamifera</i> - <i>Picea glauca</i> / <i>Alnus tenuifolia</i> / <i>Equisetum</i> spp.

SECT	NAME	L5	DESCRIPTION
		03	<i>Picea glauca</i> - <i>Populus balsamifera</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2A1A</b>		Closed dwarf tree mountain hemlock
<b>27</b>	<b>2A2B</b>		Open dwarf tree mountain hemlock
	<b>2A3Q</b>		Woodland dwarf tree mountain hemlock
		01	<i>Tsuga mertensiana</i> / <i>Vaccinium ovalifolium</i> / <i>Rubus pedatus</i> / <i>Dicranum scoparium</i> - <i>Rhytidiadelphus loreus</i>
		02	<i>Tsuga mertensiana</i> / <i>Vaccinium</i> spp./ <i>Cassiope mertensiana</i> / <i>Rubus pedatus</i>
		03	<i>Tsuga mertensiana</i> / <i>Cladanthamnus pyrolaeiflorus</i> / <i>Empetrum nigrum</i> - <i>Calamagrostis canadensis</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2A1B</b>		Closed dwarf tree subalpine fir
<b>28</b>	<b>2A2T</b>		Open dwarf tree subalpine fir
	<b>2A3T</b>		Woodland dwarf tree subalpine fir
		01	<i>Abies lasiocarpa</i> / <i>Phyllodoce aleutica</i> - <i>Fauria crista-galli</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2A1Y</b>		Closed dwarf tree black spruce
<b>29</b>	<b>2A2A</b>		Open dwarf tree black spruce
	<b>2A3A</b>		Woodland dwarf tree black spruce
		01	<i>Picea mariana</i> / <i>Myrica gale</i> - <i>Ledum</i> feathermosses- <i>Sphagnum</i> spp.
		02	<i>Picea mariana</i> / <i>Ledum decumbens</i> - <i>Vaccinium vitis-idaea</i> / <i>Rubus chamaemorus</i> / <i>Sphagnum</i> spp.
		03	<i>Picea mariana</i> / <i>Eriophorum vaginatum</i>
		04	<i>Picea mariana</i> / <i>Ledum decumbens</i> / <i>Shagnum</i> spp.
		05	<i>Picea mariana</i> / <i>Eriophorum vaginatum</i>
		06	<i>Picea mariana</i> / <i>Betula nana</i> / <i>Carex</i> spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2B1A</b>		Closed tall scrub willow
<b>30</b>	<b>2B2A</b>		Open tall scrub willow
	<b>2B1F</b>		Closed Tall Shrub Swamp
		01	<i>Salix alaxensis</i>
		02	<i>Salix alaxensis</i> / <i>Calamagrostis</i> spp.- <i>Equisetum arvense</i>
		03	<i>Salix alaxensis</i> / <i>Equisetum arvense</i>
		04	<i>Salix alaxensis</i> - <i>S. glauca</i> - <i>S. lanata</i>
		05	<i>Salix alaxensis</i> - <i>S. glauca</i> - <i>S. planifolia</i> / <i>Equisetum arvense</i>

SECT	NAME	L5	DESCRIPTION
		06	Salix alaxensis-S. planifolia
		07	Salix alaxensis-S. planifolia-Alnus tenuifolia/Vaccinium uliginosum- Betula glandulosa
		08	Salix alaxensis-S. arbusculoides-S. glauca/ Equisetum arvense-Pyrola grandiflora
		09	Salix alaxensis-S. arbusculoides/ Calamagrostis canadensis-equisetum pratense
		10	Salix planifolia
		11	Salix glauca-S. planifolia-S. lanata
		12	Salix barclayi
		13	Salix alaxensis-S. glauca
		14	Salix alaxensis/Arctostaphylos rubra
		15	Salix alaxensis/Astragalus alpinus- Epilobium latifolium
		16	Salix alaxensis/Shepherdia canadensis/ Dryas octopetala-Arctostaphylos rubra- Cladonia pyxidata
		17	Salix alaxensis/Equisetum arvense
		18	Salix alaxensis-S. glauca-S. planifolia/Equisetum arvense
		19	Salix alaxensis/Rhacomitrium canescens
		20	Salix brachycarpa-S. barclayi-S. glauca/Hylocomium splendens
		21	Salix planifolia-S. glauca/ Calamagrostis canadensis-Epilobium angustifolium-Equisetum pratense
		22	Salix lanata-S. planifolia
		23	Salix barclayi-S. glauca/Calamagrostis canadensis
		24	Salix barclayi-S. glauca/Carex lyngbyaei
		25	Salix bebbiana/Calamagrostis canadensis
		26	Salix planifolia/Calamagrostis canadensis/Sphagnum spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2B1B</b>		Closed tall scrub alder
<b>31</b>	<b>2B2B</b>		Open tall scrub alder
	<b>2B1F</b>		Closed tall shrub swamp
	<b>2B2F</b>		Open tall shrub swamp
		01	Alnus crispa/Calamagrostis canadensis
		02	Alnus crispa-Salix planifolia/ Arctagrostis latifolia-Equisetum arvense
		03	Alnus crispa/Spiraea beauverdiana
		04	Alnus crispa/Festuca altaica- Arctagrostis latifolia
		05	Alnus crispa/Carex bigelowii-Festuca altaica-Arctagrostis latifolia
		06	Alnus crispa/Equisetum arvense
		07	Alnus crispa-Salix glauca-S. planifolia/Equisetum arvense
		08	Alnus crispa-Salix arbusculoides-S. glauca/Delphinium glaucum-Aconitum delphinifolium-Calamagrostis spp.
		09	Alnus sinuata

SECT	NAME	L5	DESCRIPTION
		10	<i>Alnus sinuata</i> / <i>Calamagrostis canadensis</i>
		11	<i>Alnus sinuata</i> / <i>Rubus spectabilis</i>
		12	<i>Alnus tenuifolia</i>
		13	<i>Alnus tenuifolia</i> / <i>Calamagrostis canadensis</i>
		14	<i>Alnus crispa</i> / <i>Calamagrostis canadensis</i>
		15	<i>Alnus crispa</i> / <i>Vaccinium uliginosum</i>
		16	<i>Alnus crispa</i> / <i>Spiraea beauverdiana</i>
		17	<i>Alnus crispa</i> / <i>Carex bigelowii</i> - <i>Festuca altaica</i> - <i>Arctagrostis latifolia</i>
		18	<i>Alnus crispa</i> / <i>Festuca altaica</i> - <i>Arctagrostis latifolia</i>
		19	<i>Alnus sinuata</i> / <i>Calamagrostis canadensis</i>
		20	<i>Alnus tenuifolia</i> / <i>Calamagrostis canadensis</i>
		21	<i>Alnus tenuifolia</i> / <i>Calamagrostis canadensis</i>
		22	<i>Alnus tenuifolia</i> / <i>Carex aquatilis</i>
		23	<i>Alnus sinuata</i> / <i>Calamagrostis canadensis</i>
		24	<i>Alnus tenuifolia</i> / <i>Carex aquatilis</i> - <i>Calamagrostis canadensis</i>
		25	<i>Alnus tenuifolia</i> / <i>Myrica gale</i> - <i>Calamagrostis canadensis</i>
		26	<i>Alnus tenuifolia</i> / <i>Rosa acicularis</i> - <i>Calamagrostis canadensis</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2B1C</b>		Closed tall scrub shrub birch
<b>32</b>	<b>2B2C</b>		Open tall shrub birch
		01	<i>Betula glandulosa</i>
		02	<i>Betula glandulosa</i> / <i>Ledum decumbens</i> - <i>Vaccinium</i> spp.
		03	<i>Betula glandulosa</i> (Undescribed associations)
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2B1D</b>		Closed tall scrub alder willow
<b>33</b>	<b>2B2D</b>		Open tall alder willow
	<b>2B2F</b>		Open tall Shrub Swamp
		01	<i>Alnus crispa</i> - <i>Salix planifolia</i> / <i>Carex bigelowii</i>
		02	<i>Alnus crispa</i> - <i>Salix glauca</i> / <i>Arctagrostis latifolia</i> - <i>Pyrola grandiflora</i>
		03	<i>Alnus crispa</i> - <i>Salix lanata</i> - <i>S. planifolia</i> - <i>S. glauca</i>
		04	<i>Alnus tenuifolia</i> - <i>Salix</i> spp./ <i>Equisetum</i> spp.
		05	<i>Alnus tenuifolia</i> - <i>Salix alaxensis</i> / <i>Calamagrostis canadensis</i>
		06	<i>Alnus sinuata</i> - <i>Salix barclayi</i> - <i>S. sitchensis</i>
		07	<i>Alnus crispa</i> - <i>Salix lanata</i> - <i>S. planifolia</i> / <i>Ledum decumbens</i> - <i>Carex bigelowii</i> / <i>Sphagnum</i> spp.

SECT	NAME	L5	DESCRIPTION
		08	Alnus crispa-Salix planifolia/Carex bigelowii
		09	Salix planifolia-Alnus crispa/Betula nana-Calamagrostis spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2B1E</b>		Closed tall scrub shrub birch willow
<b>34</b>	<b>2B2E</b>		Open tall shrub birch willow
		01	Betula glandulosa-Salix planifolia-S. lanata-Alnus crispa
		02	Betula glandulosa-Salix planifolia-S. lanata-Alnus crispa
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2B1G</b>		Closed tall scrub shrub Salmonberry
<b>35</b>	<b>2B2G</b>		Open tall scrub shrub Salmonberry
		01	Rubus spectabilis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)
	<b>2B1H</b>		Closed tall scrub shrub Alder-Salmonberry
<b>36</b>	<b>2B2H</b>		Open tall scrub shrub Alder-Salmonberry
		01	Alnus sinuata - Rubus spectabilis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)
	<b>2B1I</b>		Closed tall scrub shrub Salmonberry-Blueberry
<b>37</b>	<b>2B2I</b>		Open tall scrub shrub Salmonberry-Blueberry
		01	Vaccinium spp.- Rubus specabilis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)
	<b>2C1A</b>		Closed low scrub shrub birch
<b>38</b>	<b>2C2S</b>		Open low scrub shrub birch
		1	Betula nana
		2	Betula glandulosa/Pleurozium schreberi-Hylocomium splendens
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1B</b>		Closed low scrub low willow
<b>39</b>	<b>2C2G</b>		Open low scrub willow
		01	Salix planifolia
		02	Salix planifolia-Vaccinium spp./ Arctagrostis latifolia
		03	Salix planifolia-S. lanata-Myrica gale/Calamagrostis canadensis

SECT	NAME	L5	DESCRIPTION
		04	Salix planifolia/Equisetum arvense
		05	Salix glauca-S. planifolia-S. lanata/ Equisetum arvense
		06	Salix glauca/Petasites frigidus
		07	Salix lanata/Carex spp.
		08	Salix lanata/Equisetum spp.
		09	Salix lanata/Carex aquatilis-Equisetum arvense
		10	Salix spp./Festuca rubra
		11	Salix spp./Equisetum pratense
		12	Salix glauca-Arctostaphylos rubra- Vaccinium uliginosum-Arctagrostis latifolia
		13	Salix glauca-Dryas octopetala-Betula nana
		14	Salix glauca/Petasites frigidus
		15	Salix glauca/Dryas octopetala
		16	Salix glauca/S. reticulata-Carex podocarpa-Artemisia arctica
		17	Salix glauca/Arctostaphylos rubra- Dryas octopetala-Salix reticulata- Oxytropis deflexa
		18	Salix glauca-S. planifolia-S. lanata/Equisetum arvense
		19	Salix lanata-S. glauca/Dryas integrifolia
		20	Salix lanata/Equisetum arvense
		21	Salix planifolia/S. rotundifolia-S. phlebophylla-Petasites frigidus-Poa arctica-Luzula confusa
		22	Salix planifolia-S. lanata/ Calamagrostis canadensis
		23	Salix planifolia-S. lanata-Myrica gale/Calamagrostis canadensis
		24	Salix glauca/Arctostaphylos alpina
		25	Salix glauca/Hylocomium splendens
		26	Salix planifolia/Petasites frigidus- Sphagnum spp.
		27	Salix planifolia/Betula glandulosa- Vaccinium uliginosum
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1C</b>		Closed low scrub shrub birch
<b>40</b>	<b>2C2F</b>		Open low scrub shrub birch willow
		01	Betula nana-Salix planifolia/ Hylocomium splendens-Aulacomnium turgidum
		02	Betula nana-Salix planifolia-Ledum decumbens
		03	Betula nana-Salix planifolia/Petasites frigidus
		04	Betula nana-Salix planifolia-Vaccinium uliginosum
		05	Betula nana-Salix brachycarpa-S. planifolia-S. lanata/Arctostaphylos rubra-Cassiope tetragona-Ledum decumbens
		06	Betula nana-Salix lanata/Carex aquatilis-Equisetum spp.
		07	Salix arbusculoides-S. glauca-S. hastata-Betula glandulosa/Bromus pumpellianus-Festuca altaica

SECT	NAME	L5	DESCRIPTION
		08	Betula glandulosa-Salix glauca-S. planifolia/Festuca altaica-Vaccinium vitis-idaea-Arctostaphylos alpina/Hylocomium
		09	Salix glauca-Betula nana
		10	Betula glandulosa-Salix planifolia- Vaccinium uliginosum
		11	Betula glandulosa-Salix spp.- Eriophorum spp./Hylocomium splendens
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1D</b>		Closed low scrub ericaceous shrub
<b>41</b>	<b>2C2E</b>		Open low scrub ericaceous shrub bog
		01	Cladothamnus pyrolaeiflorus
		02	Ledum decumbens-Vaccinium vitis-idaea/ Sphagnum spp.
		03	Empetrum nigrum-Ledum decumbens/ Sphagnum spp.
		04	Empetrum nigrum-Vaccinium spp.-Carex pluriflora-Rubus chamaemorus/Sphagnum spp.
		05	Empetrum nigrum-Vaccinium uliginosum- Eriophorum angustifolium-Carex pauciflora/Sphagnum recurvum-Pleurozium schrebe
		06	Empetrum nigrum-Carex pluriflora-C. pauciflora/Sphagnum spp.
		07	Empetrum nigrum-Eriophorum angustifolium-Carex pluriflora/Sphagnum recurvum- Pleurozium schreberi
		08	Empetrum nigrum-Eriophorum angustifolium/Sphagnum magellanicum-S. warnstorffii
		09	Kalmia polifolia-Empetrum nigrum- Trichophorum caespitosum-Eriophorum angustifolium/Sphagnum spp.
		10	Chamaedaphne calyculata-Salix spp.- Carex spp.
		11	Kalmia polifolia-Empetrum nigrum- Trichophorum caespitosum-Carex spp.
		12	Andromeda polifolia/Sphagnum spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1E</b>		Closed low scrub low alder willow
<b>42</b>	<b>2C2K</b>		Open low scrub low alder willow
		1	Alnus spp.-Salix spp.
		02	Alnus crispa-Salix spp./Carex bigelowii-Empetrum nigrum-Vaccinium vitis-idaea/Cetraria cucullata- Cladonia spp.
		03	Alnus crispa-Salix planifolia/ Eriophorum angustifolium/Sphagnum spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1R</b>		Closed low scrub mixed shrub-sedge tussock
<b>43</b>	<b>2C2A</b>		Open low scrub mixed shrub-sedge tussock tundra
	<b>2C2B</b>		Open low scrub mixed shrub-sedge tussock bog
		01	Eriophorum vaginatum-Salix planifolia- S. lanata



SECT	NAME	L5	DESCRIPTION
		02	Eriophorum vaginatum-Carex bigelowii- Ledum decumbens-Vaccinium vitis-idaea
		03	Eriophorum vaginatum-Betula nana-Ledum decumbens-Vaccinium spp.
		04	Eriophorum vaginatum-Betula nana-Salix planifolia-Ledum decumbens-Vaccinium spp.
		05	Eriophorum vaginatum-Betula nana-Salix lanata-Ledum decumbens-Vaccinium spp.
		06	Eriophorum vaginatum-Betula nana-Ledum decumbens-Vaccinium spp.-Carex bigelowii
		07	Eriophorum vaginatum-Betula nana-Salix planifolia-Ledum decumbens-Vaccinium spp.-Carex bigelowii
		08	Eriophorum vaginatum-Betula nana
		09	Carex bigelowii-Betula nana-Salix planifolia-Ledum decumbens-Vaccinium spp.
		10	Carex bigelowii-Salix spp.-Dryas integrifolia
		11	Carex bigelowii-Vaccinium uliginosum- feathermosses
		12	Carex bigelowii-Spiraea beauverdiana
		13	Carex bigelowii-Vaccinium spp./ Sphagnum spp.
		14	Eriophorum vaginatum-Carex bigelowii- Betula nana-Ledum decumbens-Alnus crispa
		15	Eriophorum vaginatum-Betula nana-Ledum decumbens/Sphagnum spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2CIQ</b>		Closed low scrub mesic shrub birch-ericaceous shrub
<b>44</b>	<b>2C2C</b>		Open low scrub mesic shrub birch-ericaceous shrub
	<b>2C2D</b>		Open low scrub shrub birch-ericaceous shrub bog
		01	Betula glandulosa/Vaccinium uliginosum-Empetrum nigrum-Ledum decumbens/lichen
		02	Betula glandulosa/Festuca altaica- Vaccinium spp./feathermosses-lichen
		03	Betula glandulosa/Festuca altaica/ feathermosses
		04	Betula glandulosa-Vaccinium spp.-Carex bigelowii
		05	Betula glandulosa-Ledum decumbens-Vaccinium vitis-idaea-Arctagrostis latifolia
		06	Betula glandulosa-Salix spp./Carex bigelowii-Ledum decumbens/ feathermosses-lichen
		07	Betula nana-Rubus chamaemorus-Ledum decumbens-Vaccinium spp.
		08	Betula glandulosa-Vaccinium vitis- idaea-Rubus chamaemorus/Sphagnum spp.
		09	Betula glandulosa-Vaccinium uliginosum-Carex spp./Sphagnum spp.
		10	Betula glandulosa-Andromeda polifolia/ Sphagnum spp.
		11	Betula glandulosa-Rhododendron lapponicum-Carex spp.
		12	Betula glandulosa-Myrica gale- Andromeda polifolia/Sphagnum spp.
		13	Betula glandulosa-Myrica gale-Carex spp./Sphagnum spp.
		14	Potentilla fruticosa-Myrica gale- Betula glandulosa/Empetrum nigrum/ Sphagnum spp.
		15	Potentilla fruticosa-Myrica gale- Betula glandulosa-Ledum decumbens/ feathermosses
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)

SECT	NAME	L5	DESCRIPTION
	<b>2C1T</b>		Closed low scrub willow-sedge shrub tundra
<b>45</b>	<b>2C2H</b>		Open low scrub willow-sedge shrub tundra
		01	Salix planifolia-Carex aquatilis
		02	Salix lanata-Carex aquatilis
		03	Salix lanata-Carex vaginata/Hylocomium splendens
		04	Salix lanata/Carex spp.
		05	Salix planifolia-Spiraea beauverdiana/ Carex aquatilis
		06	Salix planifolia/Carex bigelowii
		07	Salix planifolia/Carex bigelowii- Petasites frigidus/Hylocomium splendens
		08	Salix planifolia/Carex podocarpa- Petasites frigidus
		09	Salix planifolia/Carex bigelowii- Arctagrostis latifolia
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C2O</b>		Closed low scrub willow-graminoid shrub bog
<b>46</b>	<b>2C2I</b>		Open low scrub willow-graminoid shrub bog
		1	Salix spp./Carex spp./Sphagnum spp.
		2	Salix commutata/Carex aquatilis/ Calliergon giganteum
		3	Salix barclayi/Calamagrostis canadensis-Carex spp.
		4	Salix spp.-Betula nana/Calamagrostis canadensis-Carex aquatilis
		5	Salix spp./Calamagrostis canadensis/ Potentilla palustris
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1U</b>		Closed low scrub sweetgale-graminoid bog
<b>47</b>	<b>2C2J</b>		Open low scrub sweetgale-graminoid bog
		01	Myrica gale/Trichophorum caespitosum/ Sphagnum spp.
		02	Myrica gale/Empetrum nigrum-Eriophorum angustifolium-Carex pluriflora/ Sphagnum recurvum-Pleurozium schreberi.
		03	Myrica gale/Calamagrostis canadensis
		04	Myrica gale-Salix spp./Calamagrostis canadensis
		05	Myrica gale-Betula nana-Salix spp./ Calamagrostis canadensis-Carex spp.
		06	Myrica gale/Carex spp.
		07	Myrica gale-Carex saxatilis
		08	Myrica gale-Salix spp./Carex spp.
		09	Myrica gale/Rubus chamaemorus/Sphagnum spp.
		10	Myrica gale/Hordeum brachyantherum
		11	Myrica gale/Poa eminens

SECT	NAME	L5	DESCRIPTION
		12	Myrica gale-Potentilla fruticosa- Betula nana/Ledum decumbens-Rubus chamaemorus
		13	Myrica gale/Menyanthes trifoliata- Carex spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C2P</b>		Closed low scrub low alder
<b>48</b>	<b>2C2L</b>		Open low scrub low alder
		01	Alnus crispa/Vaccinium uliginosum- Ledum decumbens-Betula nana-Carex bigelowii/Hylocomium splendens-Aulocomnium
		02	Alnus crispa/Betula glandulosa-Ledum decumbens/Sphagnum spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C2M</b>		Open low scrub sagebrush-juniper
<b>49</b>		01	Sagebrush-juniper (Undescribed associations)+G529
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C2N</b>		Open low scrub sagebrush-grass
<b>50</b>		01	Artemisia frigida-Bromus pumpellianus
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2C1V</b>		Closed low scrub shrub Copperbush-Blueberry
<b>51</b>	<b>2C2V</b>		Open low scrub shrub Copperbush-Blueberry
		01	Cladothamnus pyrolaeiflorous - Vaccinium spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)
	<b>2C1W</b>		Closed low scrub shrub Copperbush-Salmonberry
<b>52</b>	<b>2C2W</b>		Open low scrub shrub Copperbush-Salmonberry
		01	Cladothamnus pyrolaeiflorous - Rubus specabilis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)
	<b>2C1Y</b>		Closed low scrub shrub Copperbush
<b>53</b>	<b>2C2Y</b>		Open low scrub shrub Copperbush
		01	Cladothamnus pyrolaeiflorous
		02	Cladothamnus pyrolaeiflorous/Cassiope spp.
		03	Cladothamnus pyrolaeiflorous/Cassiope spp./Fauria crista-galli
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)

SECT	NAME	L5	DESCRIPTION
	<b>2C1Z</b>		Closed low scrub shrub Salmonberry-Blueberry
<b>54</b>	<b>2C2Z</b>		Open low scrub shrub Salmonberry-Blueberry
		01	Rubus spectabilis - Vaccinium spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed community type (describe in Polygon notes)
	<b>2D1A</b>		Dryas dwarf scrub dryas tundra
<b>55</b>	<b>2D1B</b>		Dryas dwarf scrub dryas-sedge tundra
	<b>2D1C</b>		Dryas dwarf scrub dryas-lichen tundra
		01	Dryas octopetala
		02	Dryas octopetala-Salix arctica- Oxytropis nigrescens
		03	Dryas octopetala-Vaccinium spp.
		04	Dryas octopetala-Cassiope tetragona
		05	Dryas octopetala-Salix reticulata- Cassiope tetragona
		06	Dryas octopetala-Vaccinium uliginosum- Salix reticulata
		07	Dryas octopetala-Arctostaphylos alpina
		08	Dryas octopetala-Arctostaphylos alpina-Tomenthypnum nitens-Carex bigelowii
		09	Dryas integrifolia
		10	Dryas integrifolia-Arctostaphylos rubra
		11	Dryas integrifolia-Lupinus arcticus
		12	Dryas integrifolia-Hedysarum alpinum- Festuca rubra
		13	Dryas drummondii-D. integrifolia
		14	Dryas integrifolia-Poa glauca- Oxytropis borealis
		15	Dryas integrifolia-Vaccinium spp.
		16	Dryas integrifolia-Salix reticulata- Equisetum arvens
		17	Dryas octopetala-Carex scirpoidea
		18	Dryas octopetala-Kobresia myosuroides
		19	Dryas octopetala-Kobresia simpliciuscula
		20	Dryas octopetala-Vaccinium vitis- idaea-Luzula spp.-Carex misandra
		21	Dryas octopetala-Carex franklinii
		22	Dryas octopetala-Salix arctica-Carex bigelowii-mosses
		23	Dryas integrifolia-Salix reticulata- Carex scirpoidea
		24	Dryas integrifolia-Carex misandra- Rhytidium rugosum
		25	Dryas octopetala-Carex microchaeta
		26	Dryas octopetala-Carex misandra-C. bigelowii
		27	Dryas octopetala-Carex glacialis
		28	Dryas octopetala-Carex nardina-C. vaginata-lichens

SECT	NAME	L5	DESCRIPTION
		29	Dryas integrifolia-Carex scirpoidea- Kobresia simpliciuscula
		30	Dryas octopetala-Salix reticulata- Carex bigelowii
		31	Dryas octopetala-Salix reticulata- Carex podocarpa
		32	Dryas integrifolia-Carex scirpoidea
		33	Dryas integrifolia-Carex bigelowii
		34	Dryas integrifolia-Oxytropis nigrescens-Carex rupestris
		35	Dryas integrifolia-Carex spp.
		36	Dryas integrifolia-Eriophorum scheuchzeri-Tomenthypnum nitens
		37	Dryas octopetala-Cetraria spp.- Cladonia spp.
		38	Dryas octopetala-lichens
		39	Dryas integrifolia-lichens
		40	Dryas octopetala-lichens-Oxytropis nigrescens-Salix phlebophylla-Carex microchaeta
		41	Dryas octopetala-Stereocaulon tomentosum
		42	Dryas octopetala-Cetraria cucullata
		43	Dryas octopetala-Empetrum nigrum-Salix arctica-Cetraria spp.-Cladonia spp.
		44	Dryas octopetala-Salix reticulata- Cladonia rangiferina
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2D2A</b>		Ericaceous dwarf scrub bearberry tundra
<b>56</b>		01	Arctostaphylos alpina-Vaccinium vitis-idaea
		02	Arctostaphylos alpina-Rhododendron camtschaticum
		03	Arctostaphylos rubra-Cladina stellaris
		04	Arctostaphylos alpina-Vaccinium spp.-Empetrum nigrum-Cassiope tetragona-lichens
		05	Arctostaphylos alpina-Vaccinium uliginosum-Dicranum spp.- Rhacomitrium lanuginosum
		06	Arctostaphylos alpina-Carex bigelowii
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2D2B</b>		Ericaceous dwarf scrub vaccinium tundra
<b>57</b>		01	Vaccinium vitis-idaea-Dryas octopetala-Empetrum nigrum-Festuca altaica
		02	Vaccinium vitis-idaea-Salix phlebophylla-Arctostaphylos alpina
		03	Vaccinium vitis-idaea-Empetrum nigrum- Cladina spp.
		04	Vaccinium uliginosum-Diapensia lapponica-Phyllodoce coerulea-Salix polaris-S. arctica
		05	Loiseleuria procumbens-Vaccinium uliginosum-Salix arctica-Ledum decumbens
		06	Bryophyte-Vaccinium uliginosum-Dryas octopetala-Carex bigelowii
		07	Vaccinium spp.-Ledum decumbens- Arctostaphylos alpina-Cassiope tetragona
		08	Ledum decumbens-Vaccinium vitis-idaea- Cetraria spp.

SECT	NAME	L5	DESCRIPTION
		09	Rhododendron lapponicum-Vaccinium uliginosum-V. vitis-idaea
		10	Festuca altaica-Vaccinium vitis-idaea- V. uliginosum-Empetrum nigrum-Dryas octopetala
		11	Vaccinium uliginosum-V. vitis-idaea
		12	Vaccinium uliginosum-Empetrum nigrum- Ledum decumbens-Cladonia spp.
		13	Vaccinium uliginosum-lichens
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2D2C</b>		Ericaceous dwarf scrub crowberry tundra
<b>58</b>		01	Empetrum nigrum-Cassiope stelleriana- Phyllodoce aleutica-Vaccinium spp.
		02	Empetrum nigrum-Vaccinium spp.
		03	Empetrum nigrum-Lycopodium spp./ Brachythecium albicans-Cladonia spp.
		04	Empetrum nigrum-Carex pluriflora-C. macrochaeta/Cladonia spp.
		05	Empetrum nigrum-Cassiope lycopodioides-Carex circinnata/mosses
		06	Empetrum nigrum-Arctostaphylos alpina
		07	Empetrum nigrum-Vaccinium uliginosum
		08	Empetrum nigrum-Carex bigelowii- Arcostaphylos alpina
		09	Empetrum nigrum-Salix arctica-Cetraria spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2D2D</b>		Ericaceous dwarf scrub mountain-heath tundra
<b>59</b>		01	Phyllodoce aleutica-Cassiope stelleriana
		02	Phyllodoce aleutica-Cassiope spp.-Vaccinium spp.
		03	Phyllodoce aleutica-Cassiope mertensiana
		04	Luetkea pectinata-Phyllodoce spp.- Cassiope spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2D2E</b>		Ericaceous dwarf scrub cassiope tundra
<b>60</b>		01	Cassiope tetragona
		02	Cassiope tetragona-Salix rotundifolia- mosses
		03	Cassiope tetragona-Vaccinium uliginosum-mosses
		04	Cassiope tetragona-Vaccinium vitis-idaea
		05	Cassiope tetragona-Dryas integrifolia
		06	Cassiope tetragona-Vaccinium vitis- idaea-Carex bigelowii-Hylocomium splendens-lichens
		07	Cassiope tetragona-Dicranum spp.
		08	Cassiope mertensiana-C. stelleriana- Empetrum nigrum
		09	Luetkea pectinata-Cassiope stelleriana-Lycopodium alpinum- Cladonia spp.

SECT	NAME	L5	DESCRIPTION
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>2D3A</b>		Willow dwarf scrub shrub tundra
<b>61</b>		01	Salix rotundifolia
		02	Salix rotundifolia-Oxyria digyna
		03	Salix ovalifolia-Empetrum nigrum- Festuca rubra-Calamagrostis deschampsoides
		04	Salix polaris-S. reticulata-Hylocomium splendens-Carex podocarpa
		05	Salix ovalifolia
		06	Salix reticulata-Carex microchaeta- Rhacomitrium lanuginosum
		07	Salix reticulata-Carex saxatilis
		08	Salix rotundifolia-Potentilla vahliana-Saxifraga oppositifolia
		09	Salix polaris-Cetraria islandica- Cladina rangiferina
		10	Salix arctica-Carex nesophila-Cladina alpestris-Cetraria cucullata
		11	Salix arctica-S. rotundifolia-Empetrum nigrum
		12	Salix rotundifolia-S. ovalifolia- Cassiope lycopodioides-Empetrum nigrum
		13	Salix ovalifolia-Artemisia borealis
		14	Salix rotundifolia-S. phlebophylla
		15	Salix phlebophylla
		16	Salix reticulata-Dryas integrifolia- Carex bigelowii-Tomenthypnum nitens
		17	Salix reticulata-Ledum decumbens
		18	Salix spp.-Cassiope lycopodioides
		19	Salix reticulata-Carex bigelowii- Aulocomnium spp.
		20	Salix reticulata-Dryas octopetala- Carex scirpoidea
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A1A</b>		Elymus
<b>62</b>		01	Elymus arenarius
		02	Elymus arenarius-Honckenya peploides
		03	Elymus arenarius-Honckenya peploides- Mertensia maritima
		04	Elymus arenarius-Poa eminens- Calamagrostis canadensis
		05	Elymus arenarius-Poa eminens-Carex ramenskii
		06	Elymus arenarius-Senecio pseudo-arnica-Lathyrus maritimus
		07	Elymus arenarius-Senecio pseudo-arnica-Claytonia sibirica
		08	Elymus arenarius-Lathyrus maritimus
		09	Elymus arenarius-Lathyrus maritimus-Poa eminens
		10	Elymus arenarius-Heracleum lanatum-Angelica lucida

SECT	NAME	L5	DESCRIPTION
		11	Elymus arenarius-Heracleum lanatum-Angelica lucida-Athyrium filix-femina
		12	Elymus arenarius-Ligusticum scoticum- Anemone narcissiflora
		13	Elymus arenarius/Potentilla egedii
		14	Elymus arenarius-Festuca rubra
		15	Elymus arenarius-Lathyrus maritimus-Senecio pseudo-arnica-Angelica lucida
		16	Elymus arenarius-Polemonium boreale- Senecio pseudo-arnica
		17	Elymus arenarius-Calamagrostis canadensis-Deschampsia beringensis
		18	Elymus arenarius-Dryas integrifolia
		19	Elymus innovatus-Festuca altaica/ Hylocomium splendens
		20	Elymus innovatus-Poa glauca
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A1B</b>		Dry fescue
<b>63</b>		01	Festuca altaica
		02	Festuca altaica-Calamagrostis canadensis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A1C</b>		Midgrass-shrub
<b>64</b>		01	Festuca altaica-Salix lanata-Artemisia arctica
		02	Calamagrostis purpurascens-Artemisia frigida
		03	Festuca altaica-Empetrum nigrum-Salix reticulata
		04	Agropyron spicatum-Artemisia frigida
		05	Festuca altaica-Calamagrostis canadensis-Empetrum nigrum
		06	Poa glauca-Artemisia frigida-Calamagrostis purpurascens
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A1D</b>		Midgrass-herb
<b>65</b>	<b>3A2G</b>		Mesic grass-herb meadow tundra
		01	Festuca altaica-Anemone narcissiflora
		02	Festuca altaica-Lupinus arcticus
		03	Festuca altaica-Carex podocarpa-Aconitum delphinifolium-Mertensia paniculata-Artemisia arctica
		04	Festuca altaica-Sanguisorba stipulata-Lycopodium alpinum-Salix reticulata/ feathermosses
		05	Festuca altaica-Calamagrostis canadensis-Cornus canadensis-Geranium erianthum
		06	Festuca rubra-Dodecatheon pulchellum-Lathyrus palustris
		07	Festuca rubra-Angelica lucida-Achillea borealis-Cardamine umbellata
		08	Festuca rubra-Carex supina-Agropyron boreale



SECT	NAME	L5	DESCRIPTION
		09	Festuca rubra-Angelica lucida
		10	Festuca brachyphylla-Poa arctica
		11	Poa eminens-Potentilla egedii
		12	Poa eminens-Festuca rubra-Potentilla egedii
		13	Poa eminens-Deschampsia beringensis- Festuca rubra
		14	Agropyron pauciflorum-Epilobium angustifolium
		15	Carex macrochaeta-Festuca rubra
		16	Agropyron pauciflorum-Festuca rubra- Achillea borealis-Lathyrus palustris
		17	Poa glauca-Carex macrochaeta- Calamagrostis canadensis-Angelica lucida
		18	Carex macrochaeta-Deschampsia beringensis
		19	Potentilla egedii-Festuca rubra
		20	Hedysarum alpinum-Deschampsia beringensis
		21	Bromus pumpellianus-Trisetum spicatum- Bupleurum triradiatum
		22	Luzula confusa-Poa arctica-Petasites frigidus
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A1E</b>		Hair-grass
<b>66</b>		01	Deschampsia beringensis
		02	Deschampsia beringensis-Juncus arcticus
		03	Deschampsia beringensis-Carex lyngbyaei
		04	Deschampsia beringensis-Festuca rubra
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2A</b>		Bluejoint meadow
<b>67</b>		01	Calamagrostis canadensis
		02	Calamagrostis canadensis/Galium trifidum
		03	Calamagrostis nutkaensis/Festuca rubra
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2B</b>		Bluejoint-herb
<b>68</b>		01	Calamagrostis canadensis-Epilobium angustifolium
		02	Calamagrostis canadensis-Epilobium angustifolium-Geranium erianthum
		03	Calamagrostis canadensis-Thalictrum minus-Geranium erianthum-Epilobium angustifolium
		04	Calamagrostis canadensis-Epilobium angustifolium-Heracleum lanatum-Angelica genuflexa
		05	Calamagrostis canadensis-Deschampsia beringensis-Heracleum lanatum-Angelica lucida
		06	Calamagrostis canadensis-Festuca altaica

SECT	NAME	L5	DESCRIPTION
		07	Calamagrostis canadensis-Festuca altaica-Elymus arenarius
		08	Calamagrostis canadensis-Elymus arenarius
		09	Calamagrostis canadensis-C. nutkaensis-Geranium erianthum
		10	Calamagrostis canadensis-Equisetum sylvaticum
		11	Calamagrostis canadensis-Equisetum fluviatile-Potentilla palustris
		12	Calamagrostis canadensis-Hordeum brachyantherum
		13	Calamagrostis canadensis-Deschampsia beringensis
		14	Calamagrostis canadensis-Angelica genuflexa
		15	Calamagrostis canadensis-Carex macrochaeta-Angelica lucida
		16	Calamagrostis canadensis-Carex macrochaeta
		17	Calamagrostis canadensis-Athyrium filix-femina
		18	Carex macrochaeta-Calamagrostis nutkaensis
		19	Calamagrostis nutkaensis-Heracleum lanatum
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2C</b>		Bluejoint-shrub
<b>69</b>		01	Calamagrostis canadensis-Alnus sinuata
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2D</b>		Tussock tundra
<b>70</b>	<b>3A3A</b>		Wet sedge meadow tundra
	<b>3A3D</b>		Fresh sedge marsh
	<b>3A3F</b>		Subarctic lowland sedge wet meadow
	<b>3A3I</b>		Halophytic sedge wet meadow
	<b>3A3J</b>		Subarctic lowland sedge bog meadow
		01	Eriophorum vaginatum
		02	Eriophorum vaginatum-Salix planifolia-Carex bigelowii/Hylocomium splendens
		03	Eriophorum vaginatum-Carex bigelowii
		04	Eriophorum angustifolium
		05	Eriophorum angustifolium-E. scheuchzeri
		06	Eriophorum angustifolium-Carex membranacea
		07	Eriophorum angustifolium-E. brachyantherum-Carex aquatilis
		08	Eriophorum angustifolium-Trichophorum caespitosum
		09	Eriophorum angustifolium-Carex pluriflora-Salix reticulata
		10	Eriophorum angustifolium-Carex aquatilis-C. lachenalii
		11	Eriophorum angustifolium-Carex bigelowii

SECT	NAME	L5	DESCRIPTION
		12	Eriophorum angustifolium-Carex chordorrhiza
		13	Eriophorum angustifolium-Equisetum fluviatile
		14	Eriophorum scheuchzeri/Drepanocladus revolvens
		15	Carex aquatilis-Eriophorum angustifolium
		16	Carex aquatilis-Eriophorum angustifolium/Drepanocladus lycopodioides
		17	Carex aquatilis-Eriophorum angustifolium/Rhytidium rugosum
		18	Carex aquatilis-Eriophorum angustifolium/Scorpidium scorpioides
		19	Carex aquatilis-Eriophorum angustifolium/Sphagnum spp.
		20	Carex aquatilis-Eriophorum angustifolium-Carex rotundata
		21	Carex aquatilis-Eriophorum angustifolium-E. russeolum
		22	Carex aquatilis-Eriophorum angustifolium-E. scheuchzeri
		23	Carex aquatilis
		24	Carex aquatilis/Scorpidium scorpioides
		25	Carex aquatilis/Drepanocladus spp
		26	Carex aquatilis-C. rotundata
		27	Carex aquatilis-Eriophorum russeolum/ Drepanocladus lycopodioides
		28	Carex aquatilis-Eriophorum scheuchzeri
		29	Carex aquatilis-Eriophorum scheuchzeri-Carex rotundata
		30	Carex aquatilis-C. chordorrhiza-C. limosa-C. microglochin-Eriophorum scheuchzeri-E. angustifolium
		31	Carex chordorrhiza
		32	Eriophorum scheuchzer
		33	Carex rariflora
		34	Carex bigelowii-C. rariflora-C. saxatilis
		35	Carex rariflora-Hippuris tetraphylla/ Sphagnum spp.
		36	Carex rotundata
		37	Scirpus validus
		38	Eleocharis palustris-Hippuris vulgaris
		39	Eleocharis palustris-Myriophyllum spicatum
		40	Eleocharis palustris-Equisetum fluviatile-E. palustre
		41	Carex aquatilis
		42	Carex aquatilis-Menyanthes trifoliata/ Scorpidium spp.
		43	Carex aquatilis-Equisetum arvense
		44	Carex aquatilis-C. saxatilis
		45	Carex Aquatilis/Spiraea douglasii
		46	Carex saxatilis
		47	Carex rostrata

SECT	NAME	L5	DESCRIPTION
		48	Carex rostrata-C. aquatilis
		49	Carex rostrata-Eriophorum angustifolium-Calamagrostis canadensis
		50	Carex rostrata-Eriophorum angustifolium-Equisetum fluviatile
		51	Carex rostrata-Eriophorum angustifolium-Arctophila fulva
		52	Carex rostrata-Equisetum fluviatile
		53	Carex rostrata-C. saxatilis-Equisetum fluviatile
		54	Carex lyngbyaei
		55	Carex lyngbyaei-C. aquatilis
		56	Carex lyngbyaei-C. sitchensis
		57	Carex lyngbyaei-C. saxatilis
		58	Carex lyngbyaei-Calamagrostis canadensis
		59	Carex lyngbyaei-Lathyrus palustris
		60	Carex lyngbyaei-Cicuta mackenziana
		61	Carex lyngbyaei-C. pluriflora-C. anthoxanthea-C. macrochaeta
		62	Carex lyngbyaei-C. macrochaeta/Cladina portentosa
		63	Carex pluriflora-Deschampsia beringensis
		64	Deschampsia beringensis-Carex lyngbyaei
		65	Carex sitchensis
		66	Carex sitchensis-Caltha palustris
		67	Carex lasiocarpa
		68	Eriophorum angustifolium-Carex livida
		69	Carex subspathacea
		70	Carex subspathacea-Puccinellia phryganodes
		71	Carex ursina
		72	Carex mackenziei
		73	Carex ramenskii
		74	Carex ramenskii-Potentilla egedii
		75	Carex ramenskii-Triglochin maritimum- Potentilla egedii
		76	Carex lyngbyaei
		77	Carex lyngbyaei-Poa eminens-Potentilla egedii
		78	Carex lyngbyaei-Triglochin maritimum
		79	Carex lyngbyaei-Potentilla egedii
		80	Carex lyngbyaei-Eleocharis palustris
		81	Carex lyngbyaei-Hippuris tetraphylla
		82	Carex lyngbyaei-Polygonum amphibium
		83	Carex pluriflora

SECT	NAME	L5	DESCRIPTION
		84	Carex pluriflora-C. lyngbyaei
		85	Carex pluriflora-Triglochin palustris
		86	Carex pluriflora-Deschampsia beringensis
		87	Carex rariflora-Salix ovalifolia- Empetrum nigrum
		88	Eleocharis palustris
		89	Scirpus paludosus
		90	Eriophorum russeolum-E. scheuchzeri
		91	Eriophorum spp.-Menyanthes trifoliata
		92	Eriophorum russeolum-Carex kelloggii- Calamagrostis canadensis
		93	Eriophorum russeolum-Carex limosa- Calamagrostis canadensis
		94	Carex limosa-C. chordorrhiza
		95	Carex limosa-C. capillaris
		96	Carex pluriflora
		97	Carex pluriflora-Eriophorum russeolum
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2E</b>		Mesic sedge-grass meadow tundra
<b>71</b>	<b>3A3B</b>		Wet sedge-grass meadow tundra
	<b>3A3E</b>		Fresh grass marsh
		01	Carex aquatilis-Poa arctica
		02	Carex microchaeta-Poa arctica
		03	Carex podocarpa-Arctagrostis latifolia
		04	Dupontia fischeri
		05	Dupontia fischeri-Alopecurus alpinus
		06	Dupontia fischeri-Petasites frigidus
		07	Dupontia fischeri-Eriophorum angustifolium
		08	Dupontia fischeri-Eriophorum angustifolium/Bryum spp.
		09	Dupontia fischeri-Eriophorum scheuchzeri
		10	Eriophorum angustifolium-Carex glareosa-Deschampsia caespitosa- Dupontia fischeri-Arctagrostis latifolia
		11	Carex aquatilis-Dupontia fischeri
		12	Carex aquatilis-Dupontia fischeri/ Oncophorus wahlenbergii
		13	Carex aquatilis-Dupontia fischeri/ Bryum spp.
		14	Carex aquatilis-Dupontia fischeri- Carex membranacea
		15	Eriophorum scheuchzeri-Alopecurus alpinus
		16	Alopecurus alpinus
		17	Glyceria borealis-Eleocharis palustris

SECT	NAME	L5	DESCRIPTION
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2F</b>		Mesic sedge-herb meadow tundra
<b>72</b>	<b>3A3C</b>		Wet sedge-herb meadow tundra
		01	Carex macrochaeta-Geranium erianthum- Erigeron peregrinus-Lupinus nootkatensis
		02	Carex aquatilis-Menyanthes trifoliata
		03	Carex aquatilis-C. membranacea- Petasites frigidus
		04	Carex aquatilis-Potentilla palustris
		05	Carex nigricans-Eriophorum angustifolium-Fauria crista-galli- Trichophorum caespitosum
		06	Trichophorum caespitosum-Triglochin palustris
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2H</b>		Sedge-willow tundra
<b>73</b>	<b>3A3G</b>		Subarctic lowland sedge-shrub wet meadow
		01	Carex aquatilis-Salix planifolia
		02	Carex aquatilis-Salix lanata
		03	Carex aquatilis-Alnus crispa-Salix spp.
		04	Carex bigelowii-Salix planifolia
		05	Carex bigelowii-Salix reticulata-S. planifolia
		06	Carex bigelowii-Salix reticulata
		07	Eriophorum angustifolium-Salix planifolia
		08	Eriophorum angustifolium-Salix fuscescens
		09	Eriophorum angustifolium-Carex pluriflora-Salix reticulata
		10	Carex bigelowii-C. membranacea-Salix polaris-Equisetum arvense
		11	Carex nesophila-Salix rotundifolia-S. reticulata
		12	Carex subspathacea-Dupontia fischeri-Salix ovalifolia
		13	Carex lyngbyaei-Salix spp.
		14	Carex lyngbyaei-Myrica gale
		15	Scirpus microcarpus-Salix barclayi-S. sitchensis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2I</b>		Sedge-birch tundra
<b>74</b>		01	Carex bigelowii-C. aquatilis-Betula nana
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A2J</b>		Sedge-dryas tundra Alaska.

SECT	NAME	L5	DESCRIPTION
75		01	Carex aquatilis-Dryas integrifolia
		02	Carex bigelowii-Dryas integrifolia
		03	Carex bigelowii-Eriophorum angustifolium-Dryas integrifolia
		04	Carex bigelowii-Eriophorum angustifolium-Dryas octopetala
		05	Carex bigelowii-C. membranacea-Dryas octopetala
		06	Carex bigelowii-Dryas octopetala
		07	Carex bigelowii-Dryas octopetala-Salix reticulata
		08	Kobresia simpliciuscula-Dryas integrifolia
		09	Eriophorum angustifolium-Dryas integrifolia
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	3A3H		Halophytic grass wet meadow
76		01	Puccinellia nutkaensis-Spergularia canadensis
		02	Puccinellia nutkaensis-Suaeda depressa
		03	Puccinellia nutkaensis-Plantago maritima
		04	Puccinellia nutkaensis-Glaux maritima
		05	Puccinellia nutkaensis-Fucus spp.
		06	Puccinellia nutkaensis-Honckenya peploides
		07	Puccinellia nutkaensis
		08	Puccinellia grandis-Triglochin maritimum
		09	Puccinellia grandis-Plantago maritima- Elymus arenarius
		10	Puccinellia grandis
		11	Puccinellia glabra-Plantago maritima
		12	Puccinellia borealis-Potentilla egedii
		13	Puccinellia phryganodes
		14	Puccinellia phryganodes-Triglochin maritimum
		15	Puccinellia phryganodes-Salicornia europaea
		16	Puccinellia phryganodes-Cochlearia officinalis
		17	Puccinellia andersonii
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
77			N/A
	3A3K		Subarctic lowland sedge-moss bog meadow
78		01	Carex aquatilis-Menyanthes trifoliata/ Sphagnum spp.

SECT	NAME	L5	DESCRIPTION
		02	Carex aquatilis/Sphagnum riparium
		03	Carex nigricans-C. limosa/Sphagnum recurvum
		04	Carex limosa-C. chordorrhiza/Sphagnum spp.
		05	Carex limosa-Eriophorum russeolum/ Sphagnum fuscum-S. papillosum
		06	Carex pluriflora-Calamagrostis spp./Sphagnum spp.
		07	Carex chordorrhiza-Menyanthes trifoliata/Sphagnum spp.
		08	Carex canescens-C. magellanica/ Sphagnum teres
		09	Eriophorum russeolum-Equisetum fluviatile/Sphagnum spp.
		10	Eriophorum russeolum-Carex rotundata/Sphagnum spp.
		11	Eriophorum russeolum-Carex pluriflora/Sphagnum spp.
		12	Eriophorum russeolum-Carex limosa/ Sphagnum squarrosum
		13	Eriophorum scheuchzeri-Menyanthes trifoliata/Sphagnum spp.
		14	Trichophorum caespitosum-Eriophorum spp.-Rhynchospora alba/Sphagnum spp.
		15	Rhynchospora alba-Drosera anglica/ Sphagnum lindbergii-S. tenellum
		16	Carex pluriflora-Eriophorum russeolum/ Sphagnum teres-S. magellanicum
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3A3E</b>		Fresh grass marsh
<b>79</b>		01	Arctophila fulva
		02	Arctophila fulva-Carex aquatilis
		03	Arctophila fulva-Ranunculus pallasii
		04	Arctophila fulva-Menyanthes trifoliata
		05	Arctophila fulva-Calamagrostis canadensis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B1A</b>		Seral herbs
<b>80</b>		01	Epilobium latifolium
		02	Dryas drummondii-Epilobium latifolium
		03	Epilobium latifolium-Artemisia tilesii
		04	Epilobium latifolium-Crepis nana
		05	Hedysarum alpinum-Artemisia arctica
		06	Cochlearia officinalis-Oxyria digyna- Saxifraga rivularis
		07	Cochlearia officinalis-Phippsia algida-Stellaria humifusa
		08	Artemisia arctica ssp. comata
		09	Wilhelmsia physodes-Artemisia arctica- Chrysanthemum arcticum
		10	Equisetum variegatum



SECT	NAME	L5	DESCRIPTION
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B1B</b>		Alpine herb-sedge (snowbed)
<b>81</b>		01	Cetraria delisei-Oxyria digyna- Koenigia islandica-Saxifraga rivularis
		02	Carex lachenalii-Oxyria digyna- Claytonia sarmentosa
		03	Rhacomitrium canescens-Dicranoweisia cirrata-Oxyria digyna
		04	Anthelia julacea-Scapania paludosa- Saxifraga hirculus-Leptarrhena pyrolifolia
		05	Rubus arcticus-Sedum rosea-Polygonum bistorta-Saxifraga hirculus
		06	Carex nigricans
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B1C</b>		Alpine herbs
<b>82</b>		01	Saxifraga tricuspidata-Draba caesia
		02	Saxifraga oppositifolia
		03	Saxifraga oppositifolia-Epilobium latifolium
		04	Saxifraga tricuspidata-Artemisia arctica
		05	Potentilla hyparctica-Cerastium aleuticum-Draba aleutica
		06	Potentilla villosa-Draba hyperborea- Saxifraga bracteata
		07	Artemisia arctica-Potentilla hyparctica-Hierochloe alpina
		08	Diapensia lapponica-Saxifraga bronchialis-Sibbaldia procumbens- Trisetum spicatum
		09	Saxifraga spp.-Festuca brachyphylla- Poa glauca-Luzula confusa-Minuartia spp.
		10	Oxyria digyna-Saxifraga punctata-Sedum rosea-Primula tschuktschorum
		11	Veronica stelleri-Cassiope lycopodioides-Tofieldia coccinea-Salix rotundifolia
		12	Carex circinnata-Umbilicaria proboscidea-Agrostis borealis
		13	Geum rossii-Silene acaulis-Oxyria digyna
		14	Hierochloe alpina-Luzula tundricola- Potentilla elegans
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B2A</b>		Mixed herbs
<b>83</b>		01	Fauria crista-galli
		02	Fauria crista-galli-Caltha biflora
		03	Achillea borealis-Arnica unalaschcensis-Claytonia sibirica-Geum calthifolium
		04	Polygonum viviparum-Campanula lasiocarpa-Primula cuneifolia- Cardamine umbellata
		05	Epilobium latifolium-Mertensia paniculata-Arctagrostis latifolia stipulata-Geranium erianthum
		06	Aconitum delphinifolium-Aquilegia formosa-Sanquisorba stipulata-geranium erianthum
		07	Streptopus amplexifolius-Linnaea borealis-Juncus arcticus

SECT	NAME	L5	DESCRIPTION
		08	Platanthera spp.-Fritillaria camschatcensis-Polygonum viviparum- Erigeron peregrinus
		09	Athyrium filix-femina-Carex lyngbyaei- Heracleum lanatum-Geum macrophyllum
		10	Lupinus arcticus-Aconitum delphinifolium-Anemone narcissiflora
		11	Fritillaria camschatcensis-Aconitum maximum-Angelica lucida
		12	Iris setosa-Dodecatheon pulchellum
		13	Hedysarum alpinum-Equisetum variegatum
		14	Lupinus nootkatensis-Lathyrus maritimus-Achillea borealis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B2B</b>		Fireweed
<b>84</b>		01	Epilobium angustifolium (undescribed)
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B2C</b>		Large umbel
<b>85</b>		01	Heracleum lanatum-Veratrum viride- Senecio triangularis
		02	Heracleum lanatum-Athyrium filix- femina-Angelica lucida
		03	Artemisia tilesii-Heracleum lanatum- Elymus arenarius
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B2D</b>		Ferns
<b>86</b>	<b>3D1H</b>		Cryptogams
		01	Athyrium filix-femina-Cystopteris fragilis-Botrychium spp.- Gymnocarpium dryopteris
		02	Isoetes muricata-Ranunculus reptans- Limosella aquatica
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B3A</b>		Fresh herb marsh
<b>87</b>	<b>3B3B</b>		Subarctic lowland herb wet meadow
	<b>3B3C</b>		Subarctic lowland herb bog meadow
		01	Equisetum fluviatile
		02	Equisetum fluviatile-Menyanthes trifoliata
		03	Equisetum fluviatile-Polygonum amphibium
		04	Equisetum arvense
		05	Equisetum arvense-E. variegatum
		06	Equisetum arvense-E. variegatum/ Philonotis fontana
		07	Caltha palustris
		08	Caltha palustris-Claytonia sibirica

SECT	NAME	L5	DESCRIPTION
		09	<i>Caltha palustris</i> - <i>Sparganium hyperboreum</i>
		10	<i>Caltha palustris</i> - <i>Angelica lucida</i> - <i>Platanthera</i> spp.
		11	<i>Juncus arcticus</i>
		12	<i>Senecio congestus</i>
		13	<i>Parnassia kotzebuei</i> / <i>Philonotis fontana</i>
		14	<i>Menyanthes trifoliata</i>
		15	<i>Menyanthes trifoliata</i> / <i>Sphagnum</i> spp.
		16	<i>Menyanthes trifoliata</i> - <i>Ranunculus pallasii</i>
		17	<i>Menyanthes trifoliata</i> - <i>Potentilla palustris</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3B3D</b>		Halophytic herb wet meadow
<b>88</b>		01	<i>Hippuris vulgaris</i> - <i>Menyanthes trifoliata</i>
		02	<i>Viola langsдорffii</i> / <i>Sphagnum girgensohnii</i> - <i>Rhytidiadelphus triquetrus</i>
		03	<i>Triglochin maritimum</i>
		04	<i>Triglochin maritimum</i> - <i>Potentilla egedii</i>
		05	<i>Triglochin maritimum</i> - <i>Plantago maritima</i>
		06	<i>Triglochin maritimum</i> - <i>Puccinellia</i> spp.
		07	<i>Triglochin palustris</i> - <i>Atriplex gmelini</i>
		08	<i>Honckenya peploides</i>
		09	<i>Mertensia maritima</i> - <i>Honckenya peploides</i>
		10	<i>Cochlearia officinalis</i>
		11	<i>Cochlearia officinalis</i> - <i>Lathyrus maritimus</i>
		12	<i>Cochlearia officinalis</i> - <i>Puccinellia phryganodes</i>
		13	<i>Honckenya peploides</i> - <i>Senecio pseudo-arnica</i>
		14	<i>Cochlearia officinalis</i> - <i>Fucus distichus</i>
		15	<i>Cochlearia officinalis</i> - <i>Achillea borealis</i>
		16	<i>Plantago maritima</i> - <i>Puccinellia</i> spp.
		17	<i>Stellaria humifusa</i>
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3C1A</b>		Wet bryophyte
<b>89</b>	<b>3C1B</b>		Dry bryophyte
	<b>3D1H</b>		Cryptogams
		01	<i>Gymnocolea acutiloba</i>
		02	<i>Scapania paludosa</i> - <i>Nardia compressa</i>

SECT	NAME	L5	DESCRIPTION
		03	Nardia scalaris-Bryum stenotrichum
		04	Pleuroclada albescens
		05	Scapania paludosa-Nardia scalaris-Marsupella emarginata
		06	Rhacomitrium lanuginosum-Dicranum spp.
		07	Rhacomitrium lanuginosum-Grimmia apocarpa-Ulota phyllantha
		08	Andreaea rupestris-Grimmia apocarpa-Rhacomitrium lanuginosum
		09	Fontinalis antipyretica
		10	Siphula ceratites-Scapania paludosa
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3C2A</b>		Crustose lichen
<b>90</b>	<b>3C2B</b>		Foliose and fruticose lichen
		01	Umbilicaria spp.
		02	Umbilicaria spp.-Rhizocarpon spp.
		03	Umbilicaria spp.-Parmelia spp.
		04	Umbilicaria spp.-Cetraria spp.-Cornicularia spp.-Pseudephebe spp.
		05	Xanthorea candelaria-Ramalina scoparia-R. almquistii
		06	Lecanora spp.-Parmelia saxatilis-Xanthorea candelaria
		07	Cladina stellaris-Sphaerophorus fragilis
		08	Cladonia spp.-Cetraria spp.
		09	Cladonia spp.-Cladina spp.
		10	Alectoria spp.-Stereocaulon spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1A</b>		Pondlily
<b>91</b>		01	Nuphar polysepalum
		02	Nuphar polysepalum-Callitriche verna
		03	Nuphar polysepalum-Sparganium angustifolium
		04	Nuphar polysepalum-Isoetes muricata
		05	Nuphar polysepalum-Hippuris vulgaris
		06	Nuphar polysepalum-Potamogeton gramineus
		07	Nuphar polysepalum-Potamogeton spp.
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1B</b>		Common marestalk
<b>92</b>	<b>3D2A</b>		Four-leaf marestalk

SECT	NAME	L5	DESCRIPTION
		01	Hippuris vulgaris
		02	Hippuris vulgaris-Potamogeton gramineus
		03	Hippuris vulgaris-Sparganium hyperboreum
		04	Hippuris vulgaris-Potentilla palustris
		05	Hippuris tetraphylla
		06	Hippuris tetraphylla-Potamogeton pectinatus
		07	Hippuris tetraphylla-Potamogeton filiformis-Myriophyllum spicatum
		08	Hippuris tetraphylla-Potamogeton filiformis
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1C</b>		Aquatic buttercup
<b>93</b>		01	Ranunculus trichophyllus-Hippuris vulgaris
		02	Ranunculus trichophyllus-Potamogeton natans
		03	Ranunculus hyperboreus-R. gmelini-R. trichophyllus
		04	Ranunculus hyperboreus-R. trichophyllus
		05	Fontinalis neomexicana-Ranunculus trichophyllus
		06	Ranunculus trichophyllus
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1D</b>		Burreed
<b>94</b>		01	Sparganium hyperboreum
		02	Sparganium hyperboreum-Potamogeton perfoliatus
		03	Sparganium hyperboreum-Potamogeton pectinatus
		04	Sparganium hyperboreum-Ranunculus pallasii
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1E</b>		Water milfoil
<b>95</b>		01	Myriophyllum spicatum-Potamogeton perfoliatus
		02	Myriophyllum spicatum-Potamogeton spp.
		03	Myriophyllum spicatum-Utricularia vulgaris
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1F</b>		Fresh pondweed
<b>96</b>	<b>3D2B</b>		Brackish pondweed
		01	Potamogeton gramineus-P. alpinus
		02	Potamogeton berchtoldi-P. alpinus

SECT	NAME	L5	DESCRIPTION
		03	Potamogeton pectinatus
		04	Potamogeton filiformis-Ruppia spiralis
		05	Potamogeton perfoliatus
		06	Myriophyllum spicatum-Potamogeton filiformis
		07	Potamogeton filiformis
		08	Potamogeton spp.
		09	Potamogeton spp.-Zannichellia paustris
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D1G</b>		Water star-wort
<b>97</b>		01	Subularia aquatica-Callitriche anceps
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D3A</b>		Eelgrass
<b>98</b>		01	Zostera marina
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)
	<b>3D3B</b>		Marine algae
<b>99</b>		01	Species of Fucus, Gigartina, Porphyra, and Ulva are important
		98	Disturbed site - Clearcut/Logged or Blowdown (describe in Polygon notes)
		99	Undescribed Community Type (describe in Polygon Notes)

## APPENDIX – C

### Common Plant Species and HV Codes

Scientific	Comname	Code	Scientific	Comname	Code
<b>Clubmoss / Horsetail</b>			Cystopteris fragilis	Fragile fern	CYFR2
Equisetum fluviatile	Swamp horsetail	EQFL	Dryopteris expansa	Spreading woodfern	DREX2
pratense	Meadow horsetail	EQPR	Fern		
sp.	Horetail genus	EQUIS	Fern	Unknown fern	FERN
variegatum	Variegated scouring rush	EQVA	Gymnocarpium dryopteris	Oak-fern	GYDR
arvense	Meadow horsetail	EQAR	Polypodium glycyrrhiza	Licorice fern	POGL8
Lycopodium complanatum	Ground cedar	LYCO3	sp.	Licorice fern	POLYP
sp.	Clubmoss genus	LYCOP2	Polystichum braunii	Prickly shield-fern	POBR4
sitchense	Sitka ground pine	LYSI	lonchitis	Holly fern	POLO4
dendroideum	Tree ground-pine	LYDE	munitum	Dagger fern	POMU
clavatum	Running clubmoss	LYCL	sp.	Polystichum fern genus	POLYS
annotinum	Stiff clubmoss	LYAN2	Pteridium aquilinum	Bracken fern	PTAQ
alpinum	Alpine clubmoss	LYAL3	Thelypteris sp.	Wood fern	THELY2
selago	Fir clubmoss	LYSE	limbosperma	Mountain wood fern	THLI9
Selaginella selaginella	Mountain Spikemoss	SESE	phegopteris	Beech fern	THPH
<b>Fern / Fern allies</b>			Woodsia sp.	Woodsia genus	WOODS
Adiantum aleuticum	Aleutian maidenhair	ADAL	<b>Forb / Subshrub</b>		
Asplenium sp.	Spleenwort genus	ASPLE	Achillea borealis	Common yarrow	ACMIB
viride	Green spleenwort	ASVI10	sp.	Yarrow	ACHIL
Athyrium sp.	Lady fern genus	ATHYR	Aconitum delphiniifolium	Monkshood	ACDE2
filiX-femina	Lady fern	ATFI	Actaea rubra	Baneberry	ACRU2
Blechnum spicant	Deer fern	BLSP	Adenocaulon bicolor	American trailplant	ADBI
Botrychium lanceolatum	Lance-leaved grapefern	BOLA			
sp.	Moonwort genus	BOTRY			
Cryptogramma acrostichoides	Parsley fern	CRAC3			
sp.	Cryptogramma genus	CRYPT3			

Scientific	Comname	Code	Scientific	Comname	Code
Agoseris			sibiricus	Siberian aster	ASSI
sp.	Agoseris	AGOSE	sp.	Aster genus	ASTER
Anaphalis			Boschniakia		
margaritacea	Pearly everlasting	ANMA	rossica	Ground cone	BORO
Anemone			rossica		BORO
multifida	Cut-leaf anemone	ANMU	Brassicaceae		
sp.	Anemone	ANEMO	family	Unidentified Mustard family	BRASFAM
narcissiflora	Narcissus flowered	ANNA	family		BRASFAM
parviflora	Northern anemone	ANPA	Caltha		
Angelica			biflora	Broadleaf marsh marigold	CABI2
genuflexa	Bent-leaved angelica	ANGE2	leptosepala	Mountain marsh marigold	CALE4
lucida	Sea coast angelica	ANLU	sp.	Marsh marigold genus	CALTH
sp.	Wild celery	ANGEL	Calypso		
Antennaria			bulbosa	Fairy slipper orchid	CABU
alpina	Alpine pussytoes	ANAL4	Campanula		
sp.	Pussytoes genus	ANTEN	lasiocarpa	Mountain harebell	CALA7
Apiaceae			rotundifolia	Bluebells	CARO2
family	Unidentified Carrot family	APIAFAM	Cardamine		
Aquilegia			oligosperma var.	Umbel bittercress	CAOLK
formosa	White columbine	AQFO	oligosperma	Umbel bittercress	CAOLK
sp.	Columbine genus	AQUIL	sp.	Bittercress genus	CARDA
Arabis			oligosperma		CAOL
lyrata	Rockcress forb	ARLY2	oligosperma	Few-seeded bittercress	CAOL
lemmonii	Lemmon's rockcress	ARLE	Caryophyllaceae		
Arceuthobium			family	Unidentified Pink family	CARYFAM
sp.	Dwarf mistletoe	ARCEU	Castilleja		
Arnica			unalaschensis	Yellow paintbrush	CAUN4
amplexicaulis	Clasping arnica	ARAM2	miniata	Scarlet paintbrush	CAMI12
latifolia	Mountain arnica	ARLA8	parviflora	Mountain paintbrush	CAPA26
sp.	Arnica genus	ARNIC	parviflora		CAPA26
Aruncus			sp.	Indian paintbrush sedge	CASTI2
sylvester	Goatsbeard	ARSY2	Cerastium		
dioicus	Goatsbeard	ARDI8	beeringianum	Bering chickweed	CEBE2
sp.	Aruncus	ARUNC	Ceratophyllum		
Aster			demersum	Hornwort	CEDE4
subspicatus	Douglas aster	ASSU4	Chenopodium		
			berlandieri	Pitseed goosefoot	CHBE4
			Cicuta		
			douglasii	Water hemlock	CIDO
			Circaea		



Scientific	Comname	Code	Scientific	Comname	Code
alpina	Enchanted nightshade	CIAL	palustre	Swamp willow-herb	EPPA
Claytonia			sp.	Willow-herb genus	EPILO
sibirica	Siberian spring beauty	CLSI2	luteum		EPLU
sp.	Spring beauty	CLAYT	luteum	Yellow willow-herb	EPLU
Claytonia (Montia)			ciliatum	Purple-leaved willow-herb	EPCI
chamissoi	Chamisso's spring beauty	MOCH	anagallidifolium	Alpine willow herb	EPAN4
Clintonia			hornemannii	Hornemann willow-herb	EPHO
uniflora	Single-flower clintonia	CLUN2	latifolium	Dwarf fireweed	EPLA
Compositae			Erigeron		
family	Aster-daisy family	COMPFA	peregrinus	Coastal fleabane	ERPE3
Conioselinum			sp.	Fleabane genus	ERIGE2
gmelinii	Pacific hemlock-parsley	COGM	Fauria		
Coptis			crista-galli	Deer cabbage	FACR
trifolia	Three-leaved goldthread	COTR2	Forb		
aspleniifolia	Fern leaf goldthread	COAS	Forb	Unknown forb	FORB
Corallorrhiza			Fritillaria		
mertensiana	Mertens coral root	COME4	camschatcensis	Chocolate lilly	FRCA5
sp.	Coral root genus	CORAL2	sp.	Missionbells	FRIT1
trifida	Early coral root	COTR3	Galium		
Cornus			aparine	Cleavers	GAAP2
canadensis	Bunchberry	COCA13	kamtschaticum	Northern wild licorice	GAKA
stolonifera	Red osier dogwood	COST4	sp.	Bedstraw genus	GALIU
suecica	Swedish cornel	COSU4	trifidum	Small bedstraw	GATR2
Corydalis			triflorum	Sweet bedstraw	GATR3
sp.	Corydalis genus	CORYD	Gentiana		
Dodecatheon			glauca	Glaucous gentian	GEGL
sp.	Shooting-star genus	DODEC	platypetala	Broad-leaved gentian	GEPL
jeffreyi	Jeffrey's shooting-star	DOJE	amarella	Noorthern gentian	GEAM4
pulchellum	Pretty shooting-star	DOPU	sp.	Gentian genus	GENTI
Draba			douglasiana	Swamp gentian	GEDO
aurea	Golden rockcress	DRAU	Geocaulon		
Drosera			lividum	Northern commandra	GELI2
anglica	Long-leaf sundew	DRAN	Geranium		
rotundifolia	Roundleaf sundew	DRRO	erianthum	Nothern geranium	GEER2
Epilobium			sp.	Geranium genus	GERAN
angustifolium	Common fireweed	EPAN2	Geum		
			calthifolium	Caltha-leaved avens	GECA6
			macrophyllum	Large-leaf avens	GEMA4
			sp.	Avens	GEUM

Scientific	Comname	Code	Scientific	Comname	Code
Glaux maritima	Sea milkwort	GLMA	Lupinus nootkatensis	Nootka lupine	LUNO
Goodyera			polyphyllus sp.	Large leaf lupine	LUPO2
oblongifolia	Rattlesnake plantian	GOOB2	sp.	Lupine genus	LUPIN
Heracleum			Lysichiton americanum		
sp.	Cow parsnip	HERAC	americanum	Yellow shunk cabbage	LYAM3
lanatum	Cow parsnip	HELA4	Maianthemum dilatatum	Deerberry	MADI
Heuchera			Mentha arvensis	Field mint	MEAR8
glabra	Alpine heuchera	HEGL5			
sp.	Heuchera	HEUCH	Menyanthes trifoliata	Buckbean	METR3
Hieracium			Mertensia		
gracile	Slender hawkweed	HIGR	sp.	Bluebell genus	MERTE
sp.	Hawkweed genus	HIERA			
triste	Wooly hawkweed	HITR2	Microseris		
Hippuris			borealis	Northern silverpuffs	MIBO
tetraphylla	Four-leaf marestalk	HITE	Mimulus		
sp.	Marestail genus	HIPPU	guttatus	Yellow monkey-flower	MIGU
montana	Mountain marestail	HIMO2	lewisii	Purple monkey-flower	MILE2
vulgaris	Common marestail	HIVU2	sp.	Monkey-flower genus	MIMUL
Impatiens			Mitella		
noli-tangere	Touch-Me-Not impatiens	IMNO	pentandra	Alpine mitrewort	MIPE
Iris			sp.	Mitrewort genus	MITEL
setosa	Wild iris	IRSE	Moneses		
sp.	Iris genus	IRIS	uniflora	Single delight	MOUN2
Lathyrus			Monotropa		
sp.	Pea genus	LATHY	hypopithys	Many-flower Indian pipe	MOHY3
Leptarrhena			Montia		
pyrolifolia	Leather leaf saxifrage	LEPY	fontana	Blinks, Water chickweed	MOFO
Ligusticum			Myriophyllum		
scoticum	Beach lovage	LISC3	spicatum	Spike watermifoil	MYSP2
Liliaceae			Nuphar		
sp.	Liliaceae family	LILYFAM	polysepala	Yellow pondlilly	NUPO2
Listera			Orchidaceace sp.	Orchid family	ORCFAM
sp.	Twayblade genus	LISTE			
caurina	Western twayblade	LICA10			
cordata	Heart twayblade	LICO6			

Scientific	Comname	Code	Scientific	Comname	Code
Orthilia secunda	sidebells	ORSE	Polygonum persicaria sp. viviparum viviparum	Lady's thumb Buckwheat genus  Alpine bistort	POPE3 POLYG4 POVI3 POVI3
Osmorhiza  chilensis purpurea sp.	  Chile sweet cicely Sitka sweet cicely Cicely genus	  OSCH OSPU OSMOR	Potamogeton gramineus	Grass-leaved pondweed	POGR8
Oxyria digyna	Mountain sorrel	OXDI3	Potentilla anserina sp. diversifolia diversifolia	Silverweed Cinquefoil  Diverse leafed cinquefoil	POAN5 POTEN PODI2 PODI2
Parnassia  sp.	  Grass-of-parnassus genus	  PARNA	palustris	Marsh five-finger	POPA14
fimbriata palustris	Fringed grass-of-parnassus Northern	PAFI3 PAPA8	Prenanthes alata	Rattlesnake root	PRAL
Pedicularis oederi ornithorhyncha parviflora	Oeder lousewort Bird's beak lousewort Small-flowered lousewort	PEOE PEOR PEPA4	Primula cuneifolia	Wedge-leaf primrose	PRCU
sp.	Lousewort genus	PEDIC	Prunella  vulgaris	Heal-all	PRVU
Petasites  hyperboreus sp.	  Far northern coltsfoot Coltsfoot genus	  PEHY5 PETAS	Pyrola asarifolia chlorantha sp.	Liverleaf wintergreen Greenish flowered Wintergreen genus	PYAS PYCH PYROL
frigidus	Arctic sweet-coltsfoot	PEFR5	Ranunculus uncinatus sp. eschschoitzii cooleyae occidentalis	Uncinatus buttercup Buttercup Eschschottz buttercup Cooley buttercup Western buttercup	RAUN RANUN RAES RACO2 RAOC
Pinguicula  vulgaris sp.	  Common butterwort Butterwort genus	  PIVU PINGU	Rhinanthus minor	little yellow-rattle	RHMI13
Plantago macrocarpa maritima sp.	Seashore plantain Goose tongue Plantain genus	PLMA PLMA3 PLANT	Rumex occidentalis	Western dock	RUOC3
Platanthera orbiculata  sp.	 Round-leaved bog orchid  Bog orchid	 PLOR4  PLATA2	Sanguisorba canadensis menziesii officinalis  sp.	Canadian burnet Menzies burnet European great burnet Burnet genus	SACA14 SAME6 SAOF3 SANGU2
dilatata chorisiana hyperborea stricta	White bog orchid Choris bog orchid Northern bog orchid Slender bog orchid	PLDI3 PLCH3 PLHY2 PLST4			
Platanthera (Piperia)  unalascensis	  Alaska bog orchid	  PIUN3			

Scientific	Comname	Code	Scientific	Comname	Code
Saussurea americana	American saussurea	SAAM3	Streptopus streptopoides	Kruhsea	STST3
Saxifraga			amplexifolius	Cucumber-root	STAM2
			roseus		STRO4
punctata	Cordate-leaved saxifrage	SAPUN	roseus	Simple-stem twisted-stalk	STRO4
			sp.	Twisted-stalk nettle	STREP3
tricuspidata	Three-toothed saxifrage	SATR5	Swertia		
sp.	Saxifrage genus	SAXIF	perennis	Alpine bog swertia	SWPE
oppositifolia	Purple mountain saxifrage	SAOP			
mertensiana	Wood saxifrage	SAME7	Taraxacum		
			sp.	Dandelion genus	TARAX
ferruginea	Alaska saxifrage	SAFE	Tellima		
eschscholtzii	Ciliate saxifrage	SAES	grandiflora	Fringe cups	TEGR2
tolmiei	Tolmie saxifrage	SATO2	Thalictrum		
cespitosa	Tufted alpine saxifrage	SACE4	occidentale	Western meadowrue	THOC
bronchialis	Spotted saxifrage	SABR6	Tiarella		
bracteata	Bract saxifrage	SABR5	sp.	Foam flower genus	TIARE
lyallii	Red-stem saxifrage	SALY3	trifoliata	Three-leaved foamflower	TITR
Saxifragaceae			trifoliata var. trifoliata	Three-leaved foamflower	TITRT
sp.	Saxifragaceae family	SAXFAM	trifoliata var. unifoliata	Three-leaved foamflower	TITRU
Sedum			Tofieldia		
divergens	pacific stonecrop	SEDI	glutinosa	Sticky tofieldia	TOGL2
integrifolium	Entire leaf stonecrop	SEIN4	sp.	Asphode genus	TOFIE
			coccinea	Northern asphode	TOCO
sp.	Stonecrop genus	SEDUM	Tolmiea		
Senecio			menziesii	Youth-on-age	TOME
triangularis	Arrow-leaf groundsel	SETR	Trientalis		
Sibbaldia			europaea	Starflower	TREU
procumbens	Sibbaldia	SIPR	Trifolium		
Silene			campestre	Field clover	TRCA5
taimyrensis	Taimyr catchfly	SITA	Unknown		
acaulis	Moss campion	SIAC	plant	Unknown plant 1	UNK1
Smilacina			plant	Unknown plant 1	UNK2
racemosa	False solomon-seal	SMRAA	plant	Unknown plant 1	UNK3
Solanum			plant	Unknown plant 1	UNK4
sp.	tomato	SOLAN	Urtica		
Spiranthes			dioica	Stinging nettle	URDI
romanzoffiana	Lady's tresses	SPRO	Utricularia		
Stellaria					
crispa	Crisp starwort	STCR2			
sp.	Chickweed genus	STELL			

Scientific	Comname	Code	Scientific	Comname	Code
minor	Lesser bladderwort	UTMI	podocarpa	Short-stalked sedge	CAPO
Valeriana			pluriflora	Many-flower sedge	CAPL6
sp.	Valerian genus	VALER	pauciflora		CAPA19
sitchensis	Sitka valerian	VASI	pauciflora	Star sedge	CAPA19
capitata	Capitate valerian	VACA3	nigricans	Blackish sedge	CANI2
Veratrum			nardina	Spike sedge	CANA2
viride	False hellbore	VEVI	magellanica	Bog sedge	CAMA12
Veronica			macrochaeta	Long-awn sedge	CAMA11
sp.	Speedwell genus	VERON	lyngbyei	Lyngbye sedge	CALY3
wormskjoldii	Alpine speedwell	VEWO2	livida	Livid sedge	CALI
Vicia			kelloggii	Kellogg sedge	CAKE2
americana	American vetch	VIAM	disperma	Soft-leaved sedge	CADI6
Viola			circinata	Coiled sedge	CACI5
langsдорffii	Alaska violet	VILA6	anthoxanthea	Carex sedge	CAAN10
sp.	Violet genus	VIOLA	canescens	Silvery sedge	CACA11
palustris	Alpine marsh violet	VIPA4	mertensii	Mertens sedge	CAME6
glabella	Stream violet	VIGL	Danthonia		
canadensis	Canadian white violet	VICA4	intermedia	Timber oatgrass	DAIN
sempervirens	Redwoods violet	WISE3	Deschampsia		
Violaceae			sp.	Hairgrass genus	DESCH
family	Unidentified Violet family	VIOLFAM	Eleocharis		
			sp.	Spikerush genus	ELEOC
			Elymus		
			sp.	Ryegrass genus	ELYMU
			mollis	Dunegrass	ELMO9
<b>Grass / Grasslike</b>			Eriophorum		
Agrostis			angustifolium	Narrow-leaf cottongrass	ERAN6
aequalis	Northern bentgrass	AGAE	sp.	Cottongrass genus	ERIOP
alascana	Alaska bentgrass	AGAL2	Festuca		
sp.	Bentgrass	AGROS2	sp.	Fescue genus	FESTU
Calamagrostis			Grass		
sp.	Reed bentgrass genus	CALAM	Grass	unknown grass	GRASS
canadensis	Bluejoint grass	CACA4	Hierochloe		
nutkaensis	Pacific reed grass	CANU	alpina	Alpine holy grass	HIAL3
Carex			Hordeum		
stylosa	Variegated sedge	CAST10	brachyantherum	Meadow barley	HOBR2
aquaticilis	Water sedge	CAAQ	sp.	Barley genus	HORDE
viridula	Oederi sedge	CAVI5	Juncus		
sp.	Sedge genus	CAREX			
sitchensis	Sitka sedge	CASI3			
rostrata	Beaked sedge	CARO6			

Scientific	Comname	Code	Scientific	Comname	Code
drummondii	Drummond rush	JUDR			
ensifolius	Bog rush	JUEN	Bryoria		
mertensianus	Mertens rush	JUME3	sp.	Aborial lichen	BRYOR2
oreganus	Oregon rush	JUOR4	fuscescens	Aborial lichen	BRFU60
sp.	Rush genus	JUNCU	Cetraria		
Luzula			islandica	Island lichen	CEIS60
perpi	Piper's woodrush	LUPI2	sp.	Cetraria lichen genus	CETRA2
wahlenbergii	Wahlenberg woodrush	LUWA	Cladina		
sp.	Woodrush genus	LUZUL	mitis	Cladonia	CLMI60
arcuata	Alpine woodrush	LUAR5	portentosa	Reindeer lichen	CLPO4
multiflora	Field woodrush	LUMU2	rangiferina	Reindeer lichen	CLRA60
parviflora	Small flowered woodrush	LUPA4	sp.	Cladina lichen	CLADI3
Melica			stellaris	Stellaris lichen	CLST60
sp.	Oniongrass	MELIC	Cladonia		
Phleum			chlorophaea	False pixie-cup	CLCH3
alpinum	Mountain timothy	PHAL2	squamosa	Squamose cladonia lichen	CLSQ60
sp.	Timothy grass genus	PHLEU	sp.	Cladonia lichen	CLADO3
Poa			macilentia	Cladonia lichen	CLMA11
leptocoma	Bog bluegrass	POLE2	coccifera	Cladonia lichen	CLCO12
sp.	Bluegrass genus	POA	bellidiflora	Red-cap cladonia lichen	CLBE4
Rhynchospora			gracilis	Cladonia	CLGR13
alba	Beak rush	RHAL3	Graphis		
Trichophorum			sp.	Pencil-script lichen	GRAPH2
cespitosum	Tufted clubrush	TRCE3	Hypogmnia		
Triglochin			sp.	Hypogmnia lichen genus	HYPOG2
maritimum	Maritime arrow grass	TRMA4	Hypogymnia		
Trisetum			enteromorpha	Enteromorpha hypogymnia	HYEN60
cernuum	Nodding oatgrass	TRCE2	duplicata	Ticker tape lichen	HYDU60
spicatum	Downy oatgrass	TRSP2	Icmadophila		
Vahlodea			sp.	Crustose lichen	ICMAD
atropurpurea	Mountain hairgrass	VAAT2	ericetorum	Crustose lichen	ICER
Lichen			Lepraria		
Acarospora			sp.	Dust lichen - crustose type	LEPRA
chlorophana	Foliose yellow-green	ACCH60	Leproloma		
Alectoria			membranaceum	Lichen, synonym for	LEME13
sp.	Alectoria lichen	ALECT3	Lichen		
				Unknown lichen	LICHEN

Scientific	Comname	Code	Scientific	Comname	Code
Lobaria			sp.	Tree/rock lichen	SPHAE7
			globosus		SPGL60
			globosus	Tree/rock lichen	SPGL60
sp.	Lobaria lichen genus	LOBAR2			
linita	Felty lobaria lichen	LOLI60	Stereocaulon		
oregana	Oregana lobaria lichen	LOOR60	alpinum	Alpine stereocaulon lichen	STAL60
pulmonaria	Lobaria lichen	LOPU60	paschale	Blue sandy lichen	STPA60
			sp.	Stereocaulon lichen genus	STERE2
Nephroma					
sp.	Nephroma lichen genus	NEPHR3	Thamnomia		
arcticum	Lettuce lichen	NEAR60	sp.	Thamnomia genus	THAMN3
resupinatum	Lettuce lichen	NERE60	subuliformis	White worm lichen	THSU60
			vermicularis	Thamnomia lichen	THVE60
Parmelia					
sp.	Parmelia lichen genus	PARME2	Thelotrema		
			lepadinum	Barnacle bark crustose	THLE3
Peltigera					
aphthosa	Veined lichen	PEAP60	Umbilicaria		
britannica	British felt lichen	PEBR21	torrefacta	Umbilicate	UMTO60
canina	Canina veined lichen	PECA60			
			Usnea		
neopolydactyla	Felt lichen	PENE12	sp.	Usnea lichen genus	USNEA2
sp.	Veined lichen genus	PELT2			
Pilophorus			Liverwort		
acicularis	Pilophoron lichen	PIAC60	Apometzgeria		
			pubescens	Liverwort	APPU3
Placopsis					
gelida	Greenish-gray crustose	PLGE2	Barbilophozia		
			sp.	Maple liverwort	BARBI2
Platismatia					
glauca	Rag bag lichen	PLGL60	Bazzania		
herrei	Tattered rag lichen	PLHE60	tricrenata	Three-toothed whip	BATR4
norvegica	Laundered bag lichen	PLNO60			
sp.	Rag lichen	PLATI2	Frullania		
			sp.	Hanging millipede liverwort	FRULL
Pseudephebe					
pubescens	Liverwort	PSPU60	Hepatica		
			sp.	Liverwort genus	HEPATIC
Ramalina					
	cartilage lichen	RAMAL2	Herbertus		
			aduncus	Scissor-leaf liverwort	HERBE2
Siphula					
ceratites	Siphula lichen	SICE60	Lepidozia		
			sp.	Little hands liverwort	LEPID3
Solorina					
crocea	Solorina lichen	SOCR60	Marchantia		
			polymorpha	Liverwort	MARCH
saccata	Solorina lichen	SOSA60			
Sphaerophorus			Mylia		

Scientific	Comname	Code	Scientific	Comname	Code
sp.	Hard scale liverwort	MYLIA	sp.	Conocephalum liverwort	CONOC3
Orthocaulis floerkei	Snow-mat liverwort	3ORFL	Dichodontium pellucidum sp.	Wet rock moss Wet rock moss	DIPE7 DICH02
Pellia sp.	Ring pellia liverwort	PELLI	Dicranoweisia cirrata	Curly thatch moss	DICI5
Porella sp.	Tree ruffle liverworts	POREL	Dicranum fuscescens scoparium scoparium	Fuscescens dicranum Broom grass	DIFU5 DISC71 DISC71
Preissia sp.	Liverwort	PREIS	sp.	Dicranum moss genus	DICRA8
Scapania sp.	Yellow ladle liverwort	SCAPA	Eurhynchium oreganum sp.	Oregon beaked moss, Wiry moss	EUOR2 EURHY2
<b>Moss</b>			Heterocladium dimorphan	Tangle moss	HEDI8
Andreaea rupestris sp.	Black rock Moss Moss	ANRU7 ANDRE2	Homalothecium fulgescens	Yellow moss	HOFU70
Antitrichia curtipendula	Hanging moss	ANCU3	Hookeria lucens	Hookina	HOLU
Atrichum selwynii	Crane's bill moss	ATSE3	Hylocomium splendens sp.	Splender hylocomium Feathermoss genus	HYSP70 HYLOC2
Aulacomnium palustre sp.	Ribbed bog moss Bog moss genus	AUPA70 AULAC2	Hypnum circinale sp. subimponens	Hypnum moss Hypnum moss genus Hynum moss	HYCI70 HYPNU2 HYSU70
Bartramia pomiformis	Apple moss	BAPO70	Isothecium myosuroides sp.	Cattail moss Cat tail moss	ISMY2 ISOTH
Brachythecium sp.	Brachythecium moss	BRACH10	Leucolepis sp. acanthoneuron	Tree moss Menzies' tree moss	LEUCO11 LEAC8
Bryum sp.	Bryum moss genus	BRYUM2	Metaneckera menziesii	Menzies' neckera moss	MEME8
Claopodium crispifolium	Rough moss	CLCR4	Mnium sp.	Mnium moss genus	MNIUM2
Climacium dendroides	Northern tree moss	CLDE70			
Conocephalum					



Scientific	Comname	Code	Scientific	Comname	Code
Moss	Unknown moss	MOSS	lozeus	Ryidiadelphus moss	RHLO70
			sp.	Rhyidiadelphus moss	RHYTI2
Neckera	Douglas' neckera	NEDO70	sp.		RHYTI2
			triquetrus	Shaggy moss	RHTR70
Oligotrichum	Large hair moss	OLPA2	Rhytidopsis		
			robusta	Pipe cleaner moss	RHRO7
Plagiochila	Cedar shake liverwort	PLAGI2	Rhytidium		
			sp.	Rhytidium moss genus	RHYTI4
Plagiomnium	Badge moss	PLAGI7	rugosum	Rhytidium moss	RHRU70
			sp.	Spikemoss genus	SELAG
Plagiothecium	Channel Island moss	PLAGI3	Sphagnum		
			angustifolium	Sphagnum moss	SPAN11
Pleurozium	Schreber's moss	PLSC70	capillifolium	Sphagnum moss	SPCA70
			girgensohnii	Sphagnum moss	SPGI70
Pogonatum	Haircap moss	POCO34	lindbergii	Sphagnum moss	SPLI70
			papillosum	Sphagnum moss	SPPA71
Pohlia	Pohlia moss	POWA70	sp.	Sphagnum moss genus	SPHAG2
			squarrosus	Squarrose sphagnum	SPSQ70
Polytrichum	Hair-cap moss	POCO38	Timmia		
			austriaca	Indian Brave Moss	TIAU70
Ptilium	Knight's plume moss	PTCR70	Tortella		
			fragilis	Moss	TOFR70
Racomitrium	Black-tufted rock moss	RAAC4	tortuosa	Moss	TOTO70
			Ulotia		
Rhizomnium	Moss, Pojar shows	RACOM	sp.	Twisted ulotia moss	ULOTA
			Other		
Rhyidiadelphus	Rhizomnium moss	RHGL70	Bare		
			ground	Bare ground	GROUND
Rhytidium	Rhizomnium moss	RHIZO2	Basal		
			vegetation	Basal vegetation	BASAL
Rhytidium	Rhizomnium moss	RHIZO2	Downed		
			wood	Dead downed wood	DOWNWD
Rhytidium	Rhizomnium moss	RHIZO2	Fomitopsis		
			pinicola	conk	3FOPI
Rhytidium	Rhizomnium moss	RHIZO2	Ganoderma		

Scientific	Comname	Code	Scientific	Comname	Code
applanatum	artist's conk	3GAAP	sp. stelleriana	Cassiope genus Alaksa moss heath	CASSI3 CAST33
Mushroom					
sp.	Unknown mushroom	MUSHRM	Cladothamnus pyroliflorus	Copperbush	CLPY3
Residue & litter	Litter	RESIDUE	Crataegus douglasii	Black hawthorn	CRDO2
Rock (solid) (broken)	Solid rock Broken rock	ROCKSD ROCKBN	Diapensia lapponica	Diapensia	DILA
Rocks (rock)	Rock	ROCKS	Dryas drummondii integrifolia sp. sp.	Yellow dryas Entire leaf mountain avens Mountain avens genus	DRDR DRIN4 DRYAS DRYAS
Snags (snag)	Snags	SNAGS	Empetrum nigrum nigrum	Black crowberry	EMNI EMNI
Stumps (snag)	Stumps	STUMPS	Gaultheria shallon shallon	Salal	GASH GASH
Water (flowing) (standing)	Flowing water Standing water	WATERFL WATERST	Kalmia polifolia	Bog laurel	KAPO
<b>Shrub</b>			Ledum groenlandicum palustre	Labrador tea Marsh labrador tea	LEGR LEPA11
Acer glabrum	Rocky Mountain maple	ACGL	Linnaea borealis	Twin flower	LIBO3
Alnus sinuata	Sitka alder	ALSI3	Loiseleuria procumbens	Alpine azalea	LOPR
sp. rubra tenuifolia	Alder genus Red alder Thinleaf alder	ALNUS ALRU2 ALTE2	Luetkea pectinata	Luetkea	LUPE
Andromeda polifolia	Bog rosemary	ANPO	Malus fusca sp.	Oregon crabapple Crabapple	MAFU MALUS
Arctostaphylos rubra	Alpine bearberry	ARRU	Menziesia ferruginea	Rusty menziesia	MEFE
Artemisia arctica sp.	Arctic wormwood Sagebrush genus	ARAR9 ARTEM	Myrica gale	Sweet gale	MYGA
Cassiope tetragona mertensiana	Four-angle heather Mertens cassiope	CATE11 CAME7	Oplopanax		

Scientific	Comname	Code	Scientific	Comname	Code
horridus	Devil's club	OPHO	Shepherdia		
Phyllodoce			canadensis	Buffalo berry	SHCA
glanduliflora	yellow mountain-heath	PHGL6	Shrub		
empetriformis	Pink mountain heather	PHEM	sp.	Unknown shrub	SHRUB
aleutica	Aleutian mountain-heather	PHAL4	Sorbus		
sp.	Mountain heather genus	PHYLL3	sp.	Mountain ash genus	SORBU
Potentilla			scopulina	Greene mountain-ash	SOSC2
fruticosa	Bush cinquefoil	POFR4	sitchensis	Sitka moutain ash	SOSI2
Ribes			Spiraea		
bracteosum	Stink currant	RIBR	douglasii	Douglas spirea	SPDO
glandulosum	Shunk currant	RIGL	sp.	Spirea genus	SPIRA
lacustre	Swamp goose currant	RILA	stevenii	steven's meadowsweet	SPST3
laxiflorum	Trailing black currant	RILA3	Vaccinium		
sp.	Currant genus	RIBES	cespitosum	Dwarf blueberry	VACE
Rosa			uliginosum	Bog blueberry	VAUL
acicularis	Prickly rose	ROAC	vitis-idaea	Lowbush cranberry	VAVI
Rubus			sp.	Blueberry genus	VACCI
chamaemorus	Cloudberry	RUCH	ovalifolium	Early blueberry	VAOV
spectabilis	Salmonberry	RUSP	alaskense	Alaska blueberry	VAAL
pedatus	Five-leaf bramble	RUPE	Oxycoccus var.	Bog cranberry	VAOX
parviflorus	Thimbleberry	RUPA	parvifolium	Red huckleberry	VAPA
idaeus	American red raspberry	RUID	Viburnum		
arcticus	Nagoon berry	RUAR	edule	Highbush cranberry	VIED
leucodermis	Black raspberry	RULE	Tree		
Salix			Abies		
arctica	Arctic willow	SAAR4	amabilis	Pacific silver fir	ABAM
sp.	Willow genus	SALIX	lasiocarpa	Subalpine fir	ABLA
reticulata	Netleaf willow	SARE2	Betula		
sitchensis	Sitka willow	SASI2	papyrifera	Paper birch	BEPA
stolonifera	Sprouting-leaf willow	SAST2	Chamaecyparis		
scouleriana	Scouler willow	SASC	nootkatensis	Alaska yellow cedar	CHNO
monticola	Park willow	SAMO2	Juniperus		
barclayi	Barclay willow	SABA3	communis	Common mountain juniper	JUCO6
alaxensis	Feltleaf willow	SAAL	communis		JUCO6
myrtilifolia	Low blueberry willow	SAMY	Picea		
commutata	Undergreen willow	SACO2	sitchensis		PISI
Sambucus			sitchensis	Sitka spruce	PISI
racemosa	Red elderberry	SARA2			
sp.	Elderberry genus	SAMBU			

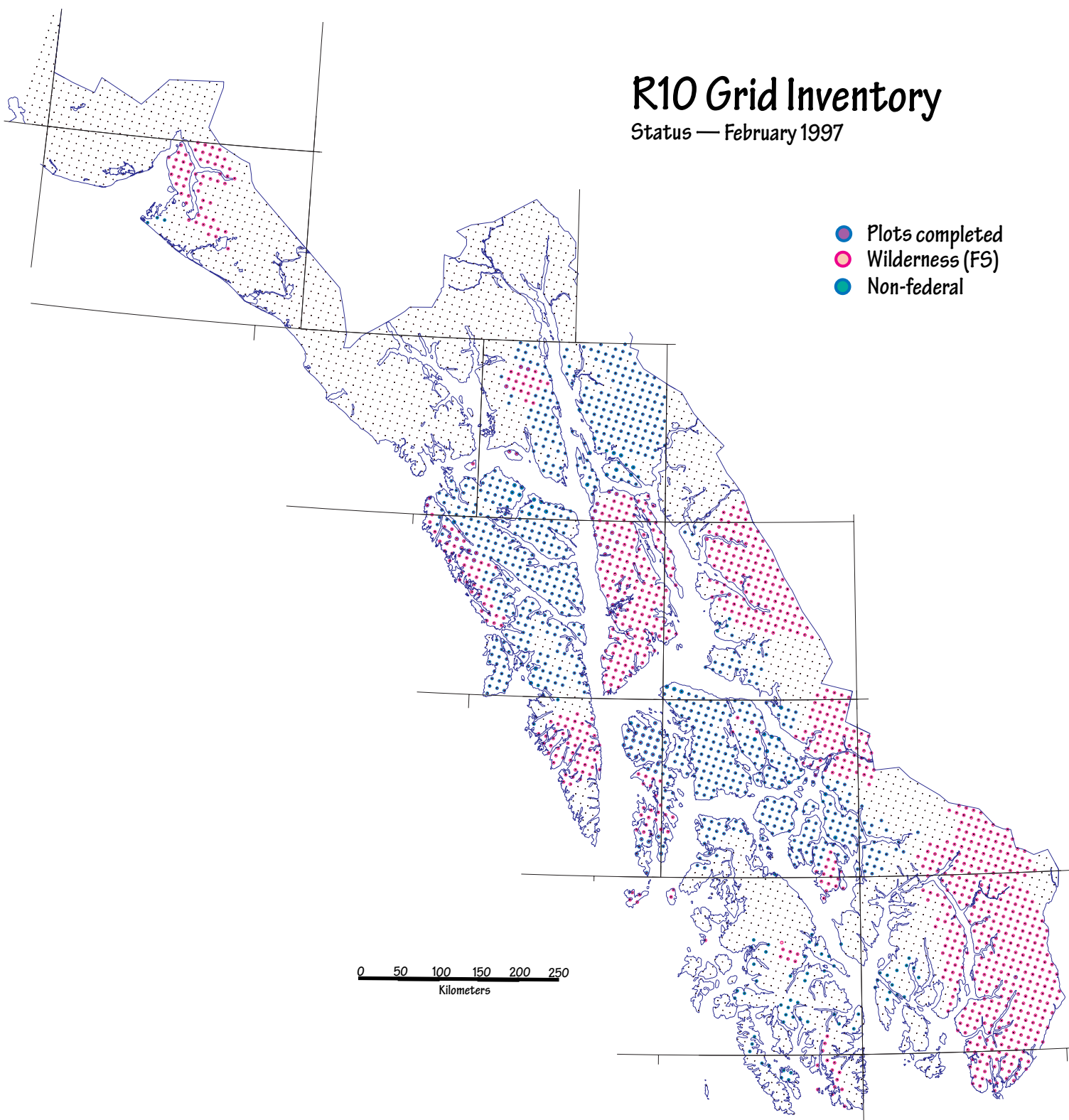
Scientific	Comname	Code	Scientific	Comname	Code
Pinus contorta	Lodgepole pine	PICO			
Populus trichocarpa	Black cottonwood	POTR15			
Thuja plicata	Western red cedar	THPL			
Tsuga mertensiana	Mountain hemlock	TSME			
heterophylla	Western hemlock	TSHE			

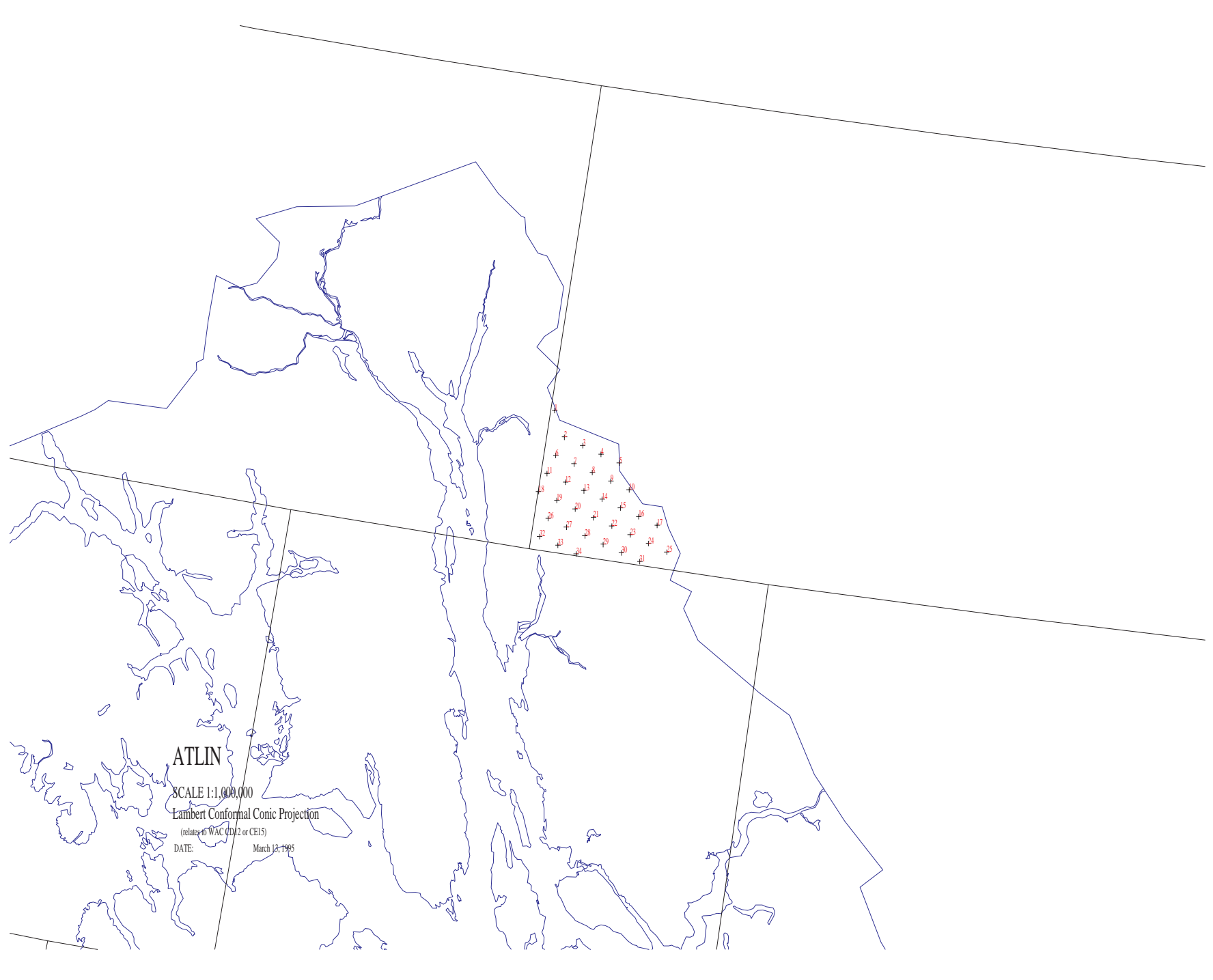
# R10 Grid Inventory

Status — February 1997

- Plots completed
- Wilderness (FS)
- Non-federal

0 50 100 150 200 250  
Kilometers





ATLIN

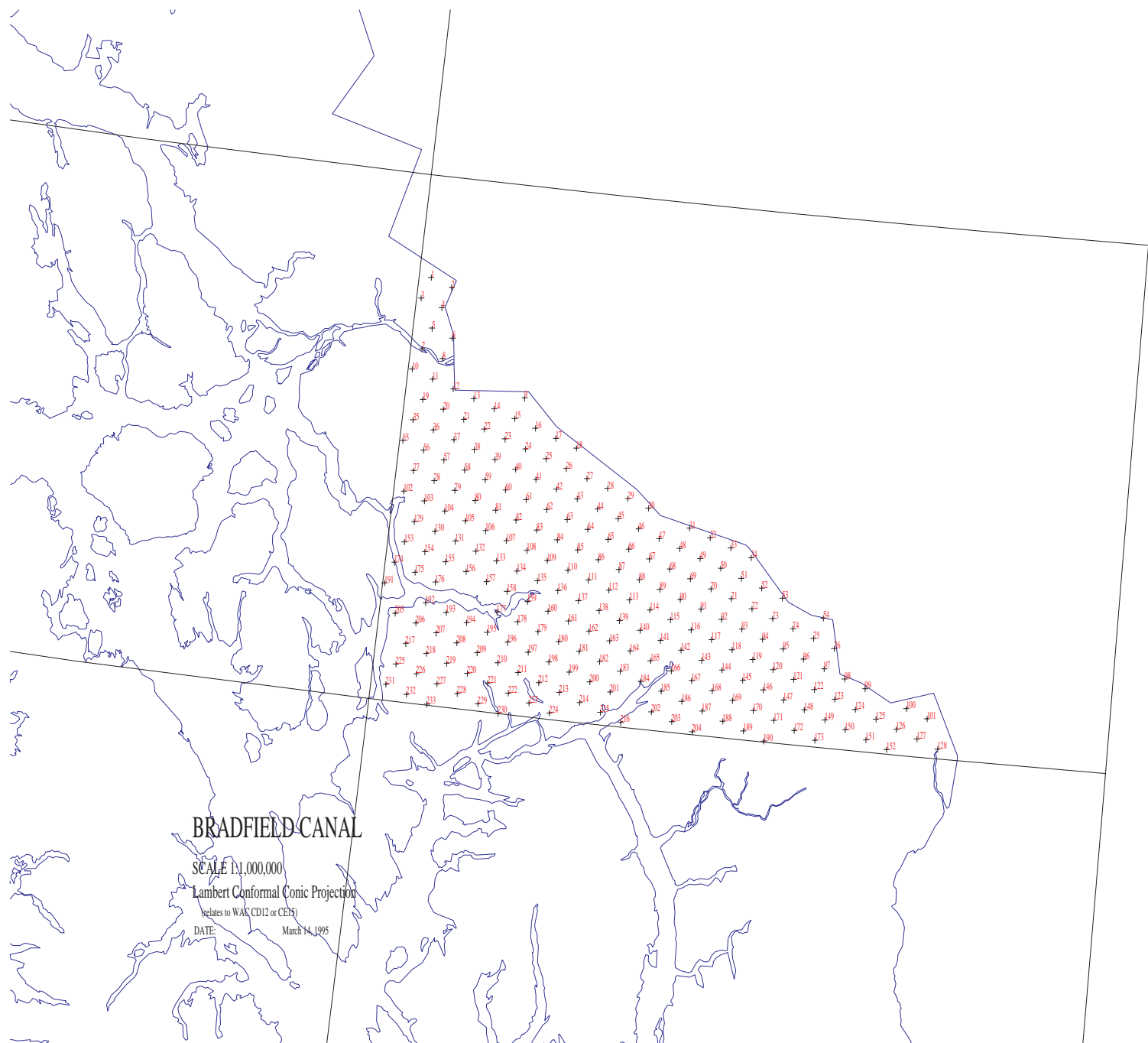
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Lambert Conformal Conic Projection

(related to WACD12 or CE15)

DATE:

March 13, 1995



# BRADFIELD CANAL

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Lambert Conformal Conic Projection

(relates to WAC CD12 or CE15)

DATE: March 14, 1995

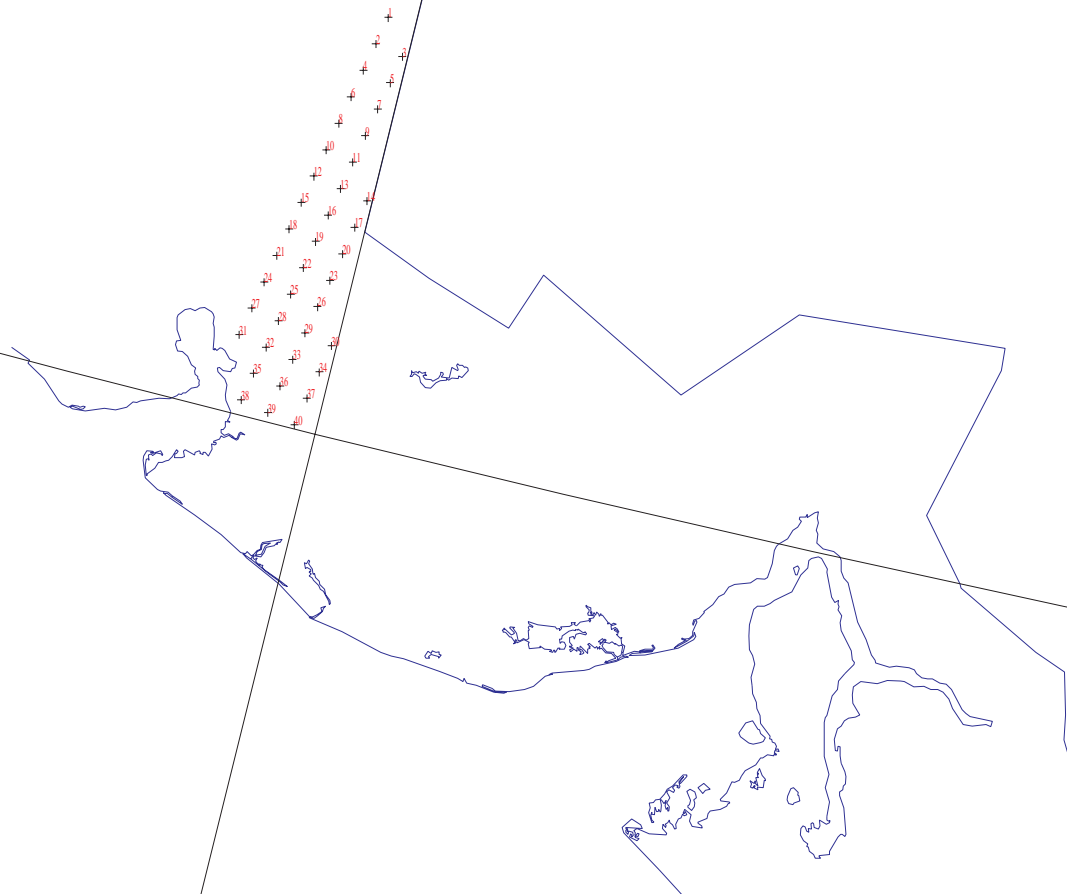
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Lambert Conformal Conic Projection

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DATE: March 13, 1995





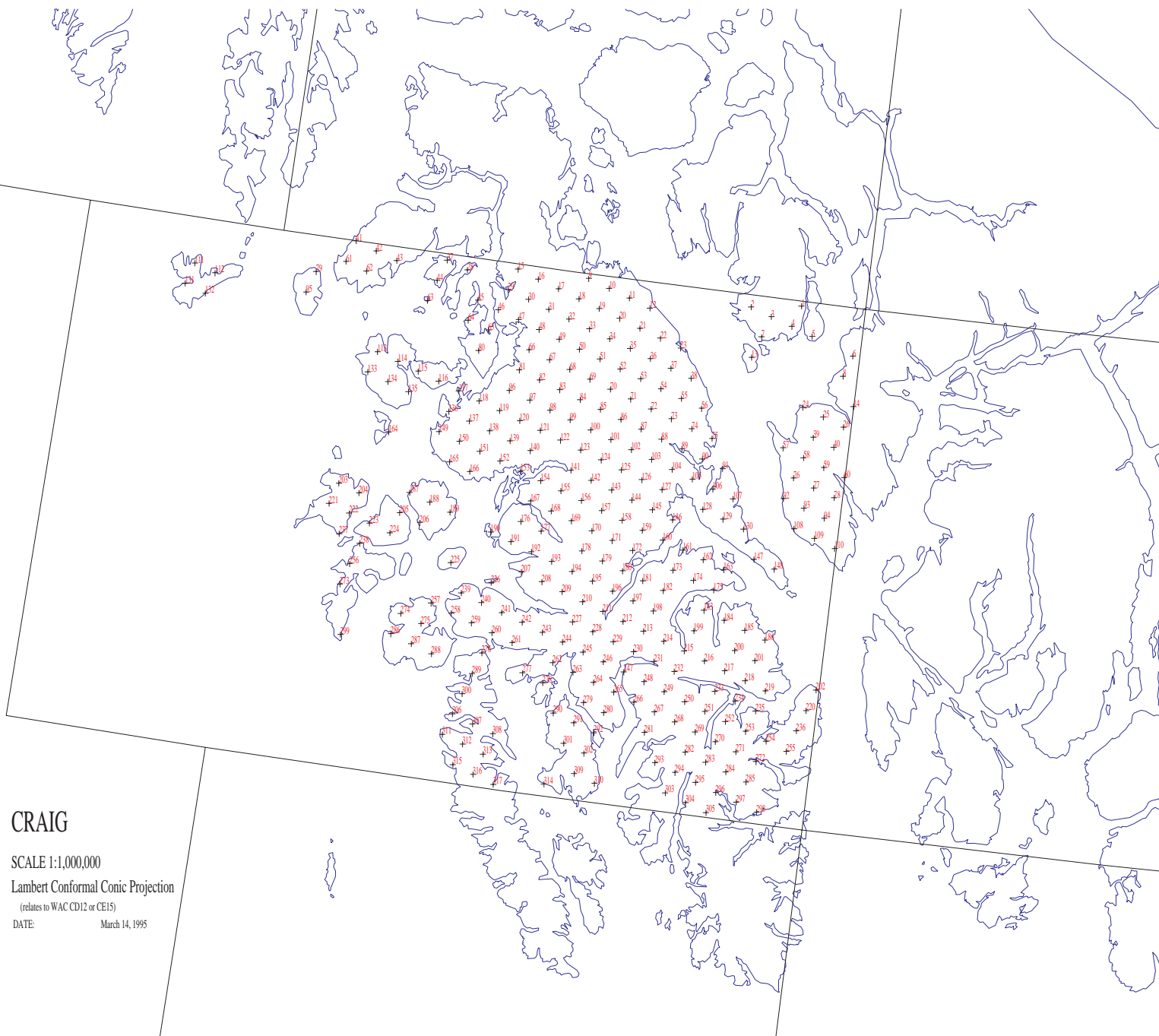
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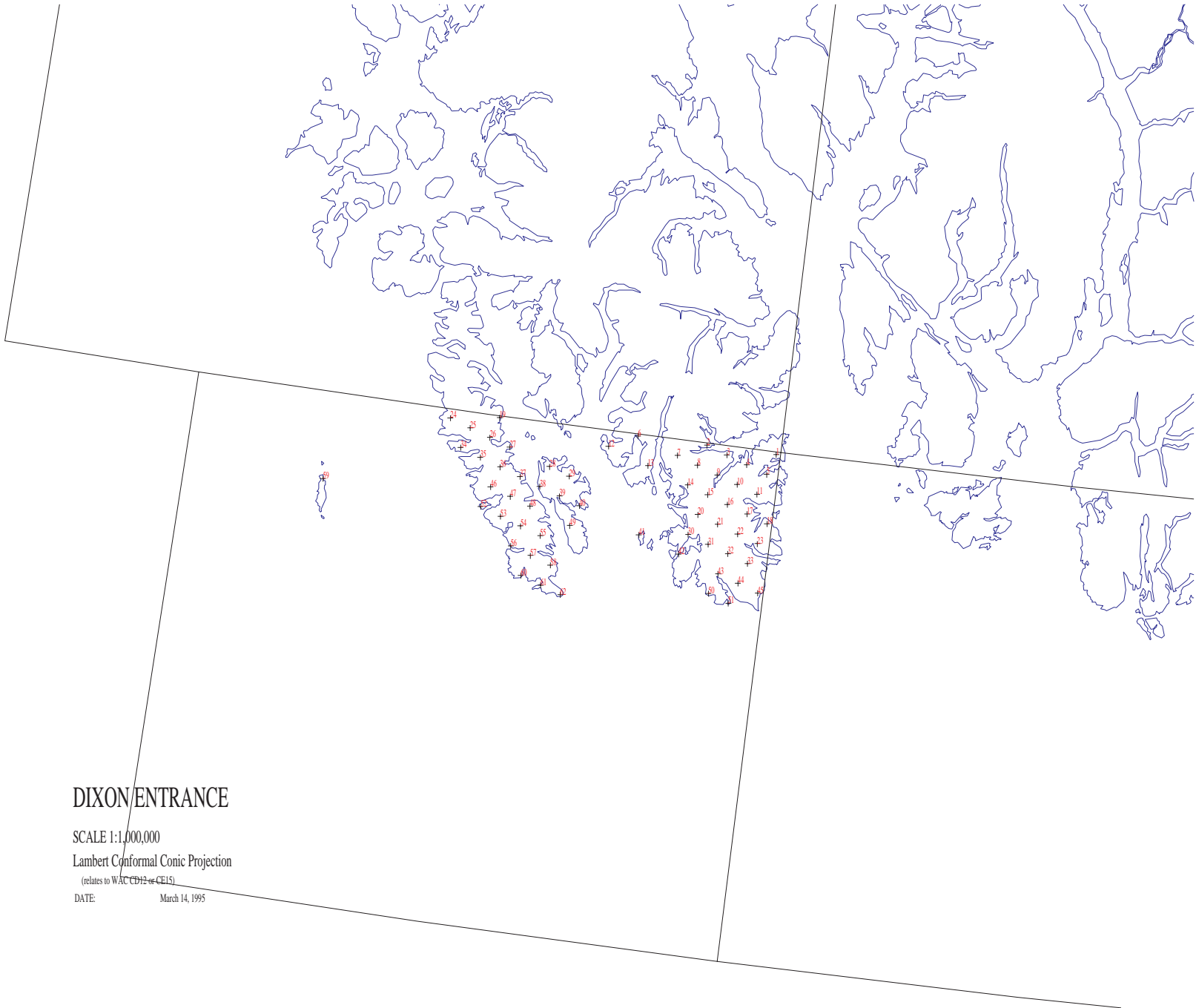
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Lambert Conformal Conic Projection

(relates to WAC CD12 or CE15)

DATE: March 14, 1995





## DIXON ENTRANCE

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Lambert Conformal Conic Projection

(relates to WACCD12-CE15)

DATE: March 14, 1995

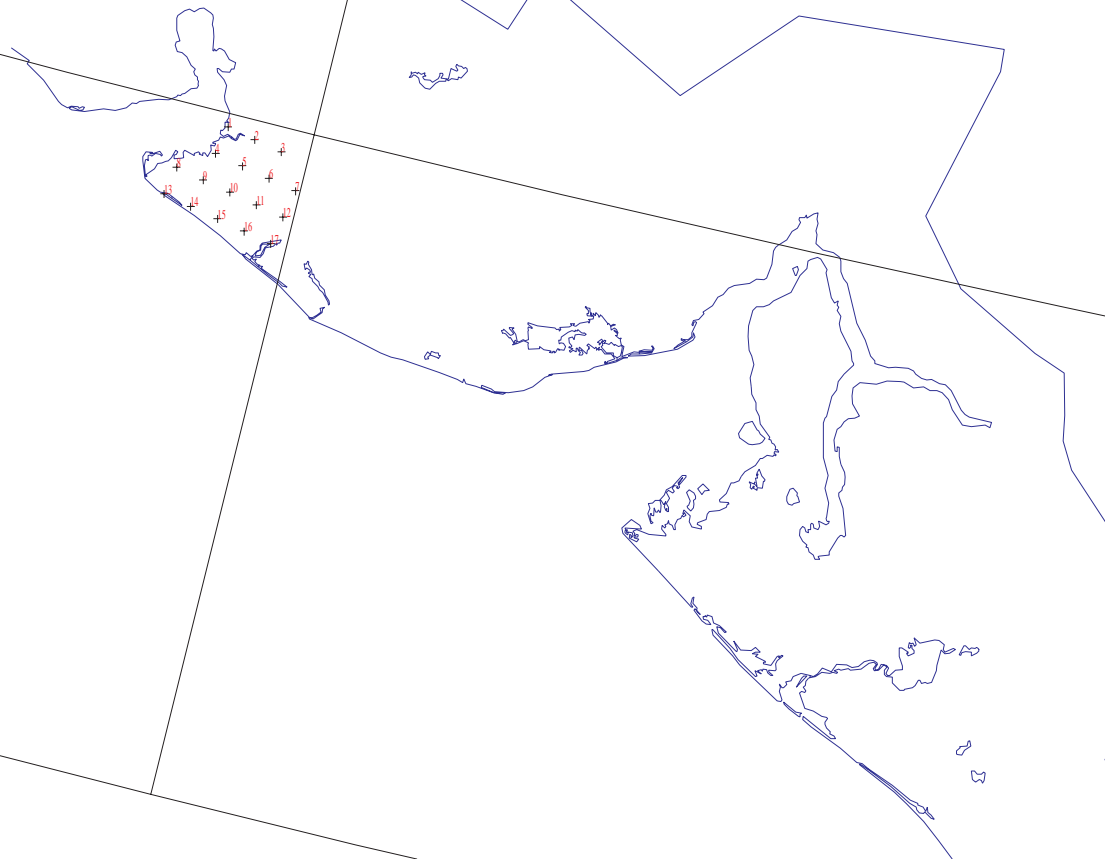
# ICY BAY

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WAC D12 or CE15)

DATE: March 13, 1995



# JUNEAU

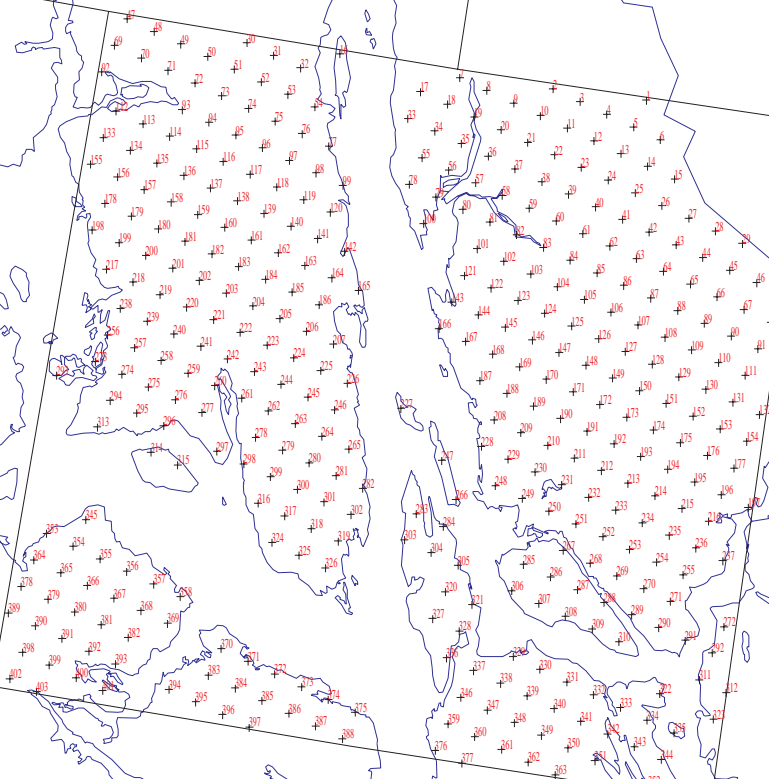
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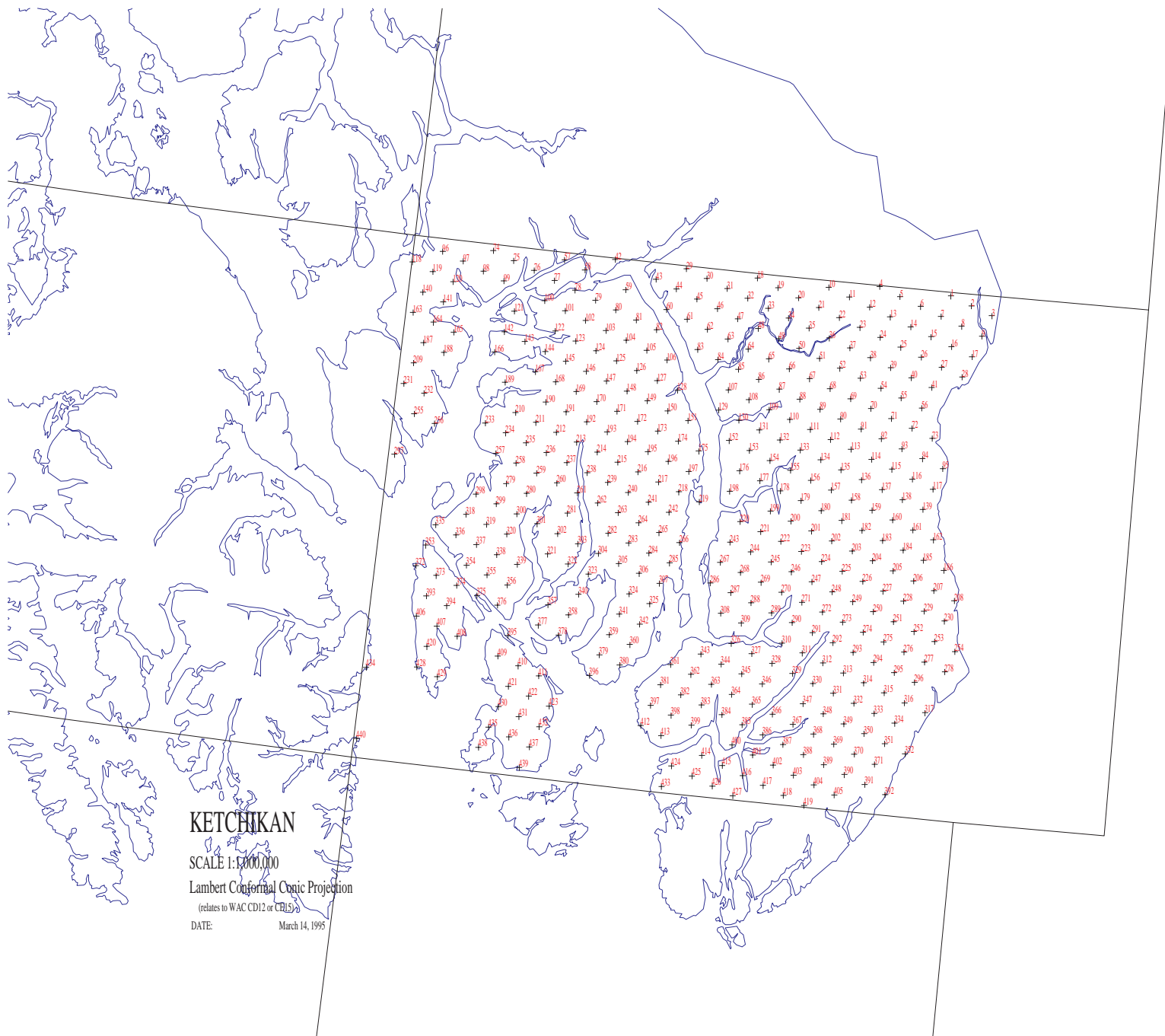
Lambert Conformal Conic Projection

(relates to WACD12 or CD13)

DATE:

March 1, 1998





# KETCHIKAN

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WAC CD12 or CBL15)

DATE:

March 14, 1995

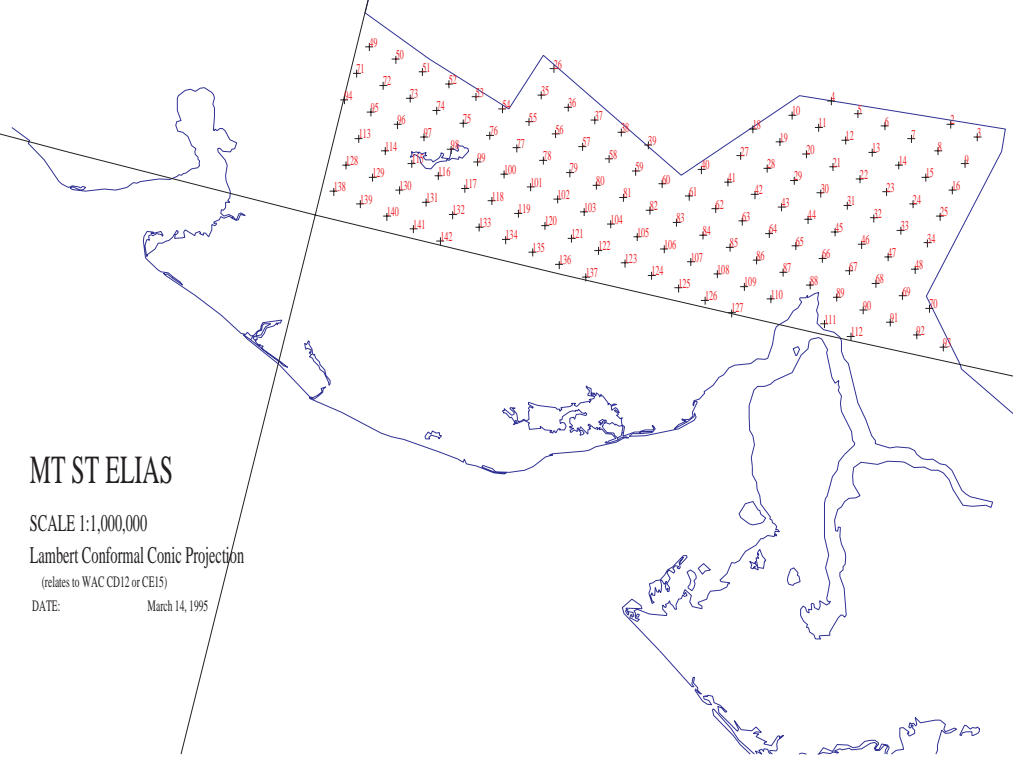
# MT ST ELIAS

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 14, 1995



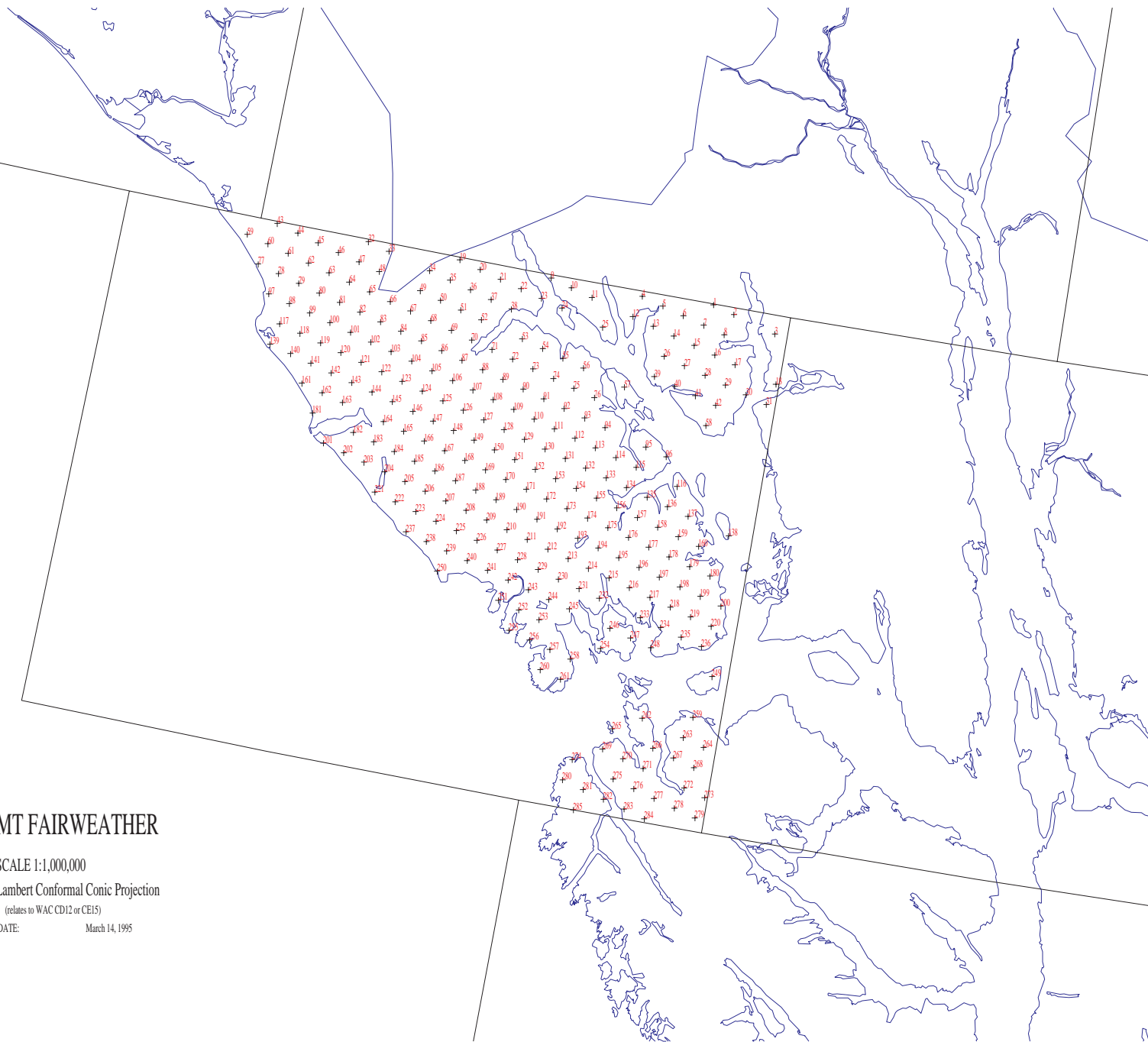
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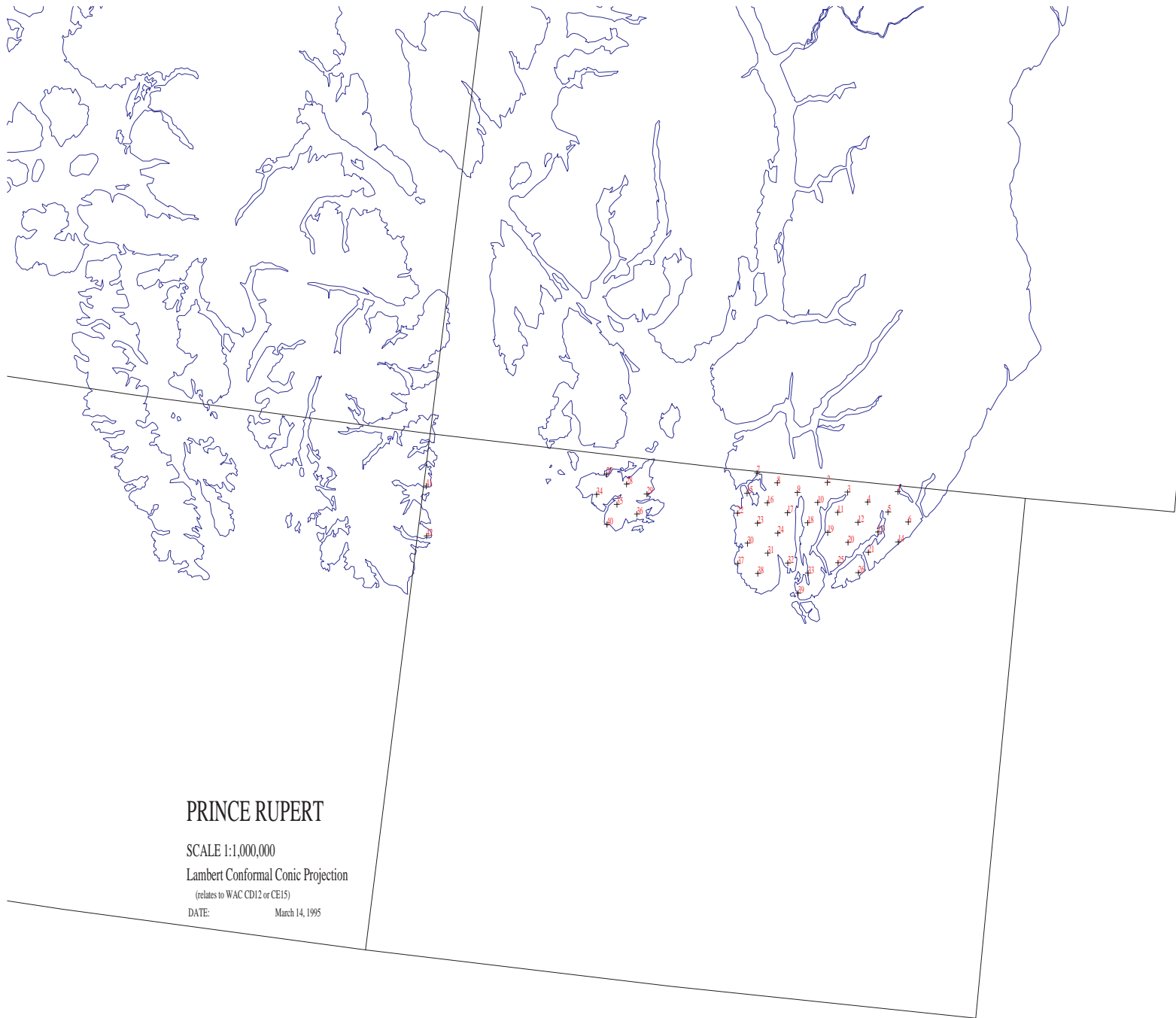
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Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 14, 1995





# PRINCE RUPERT

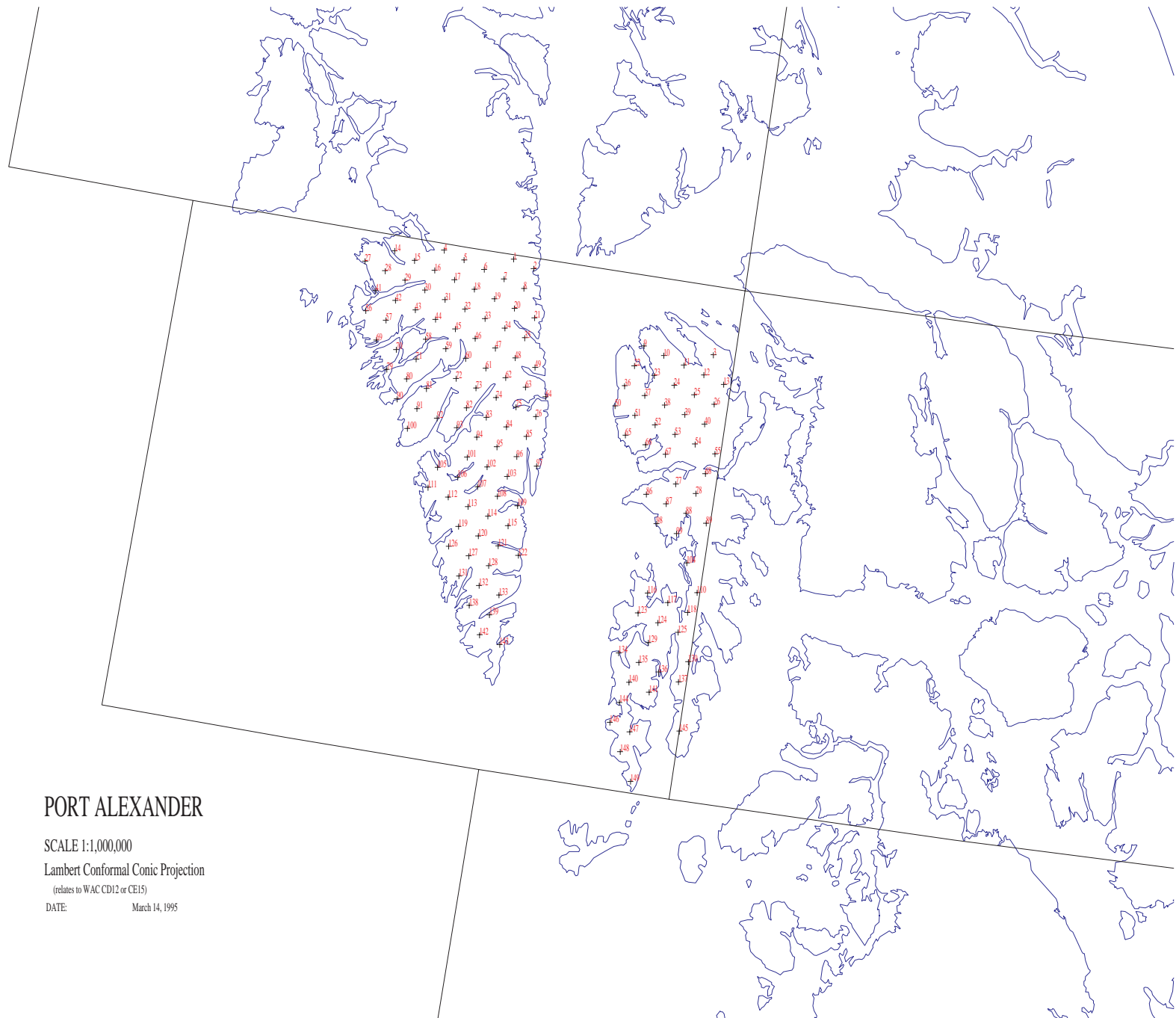
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Lambert Conformal Conic Projection

(relates to WAC CD12 or CE15)

DATE: March 14, 1995





## PORT ALEXANDER

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 14, 1995

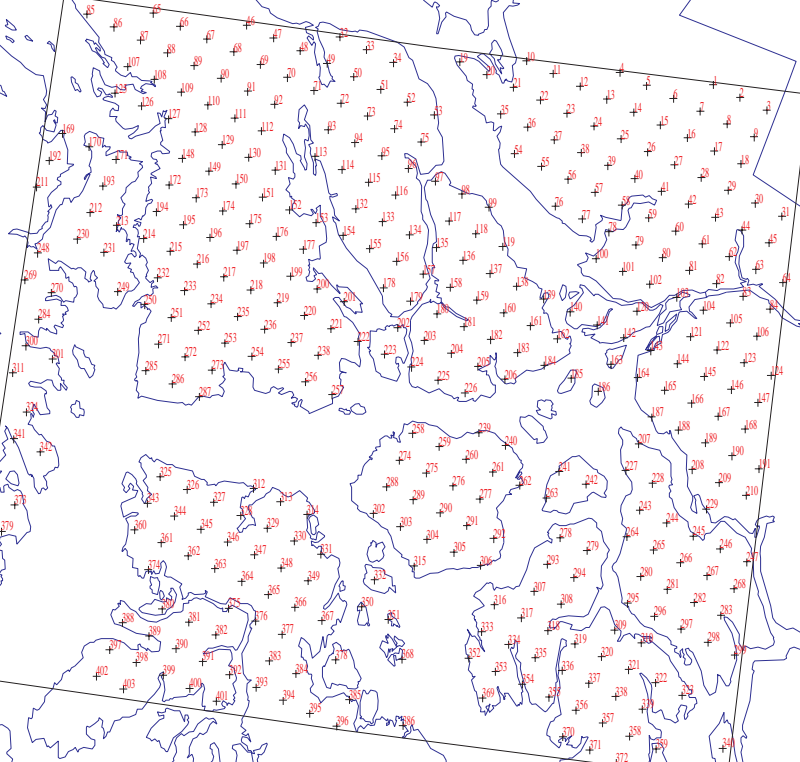
# PETERSBURG

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 14, 1995



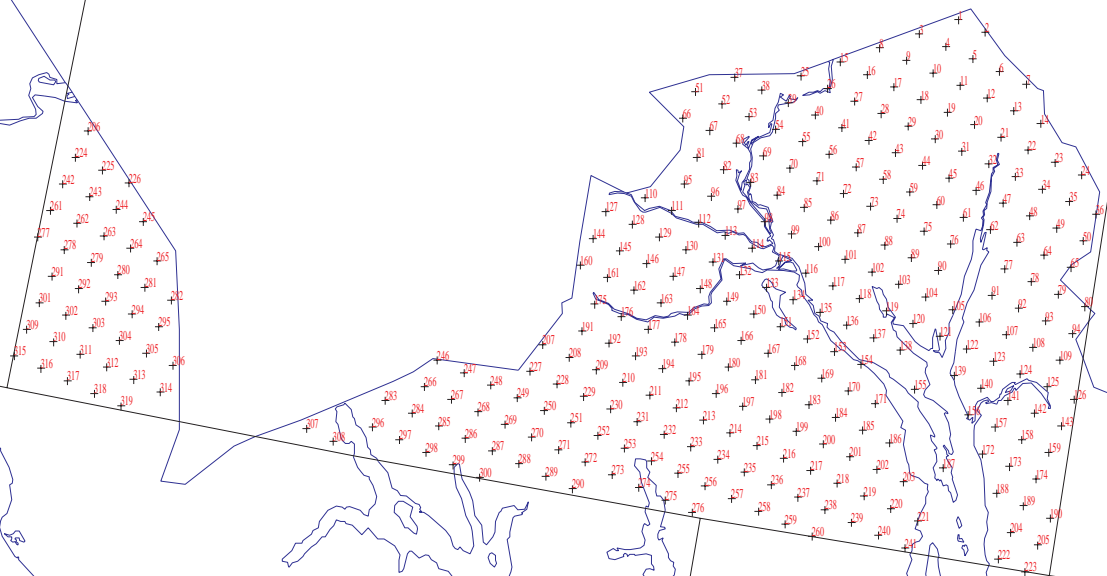
# SKAGWAY

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 13, 1995



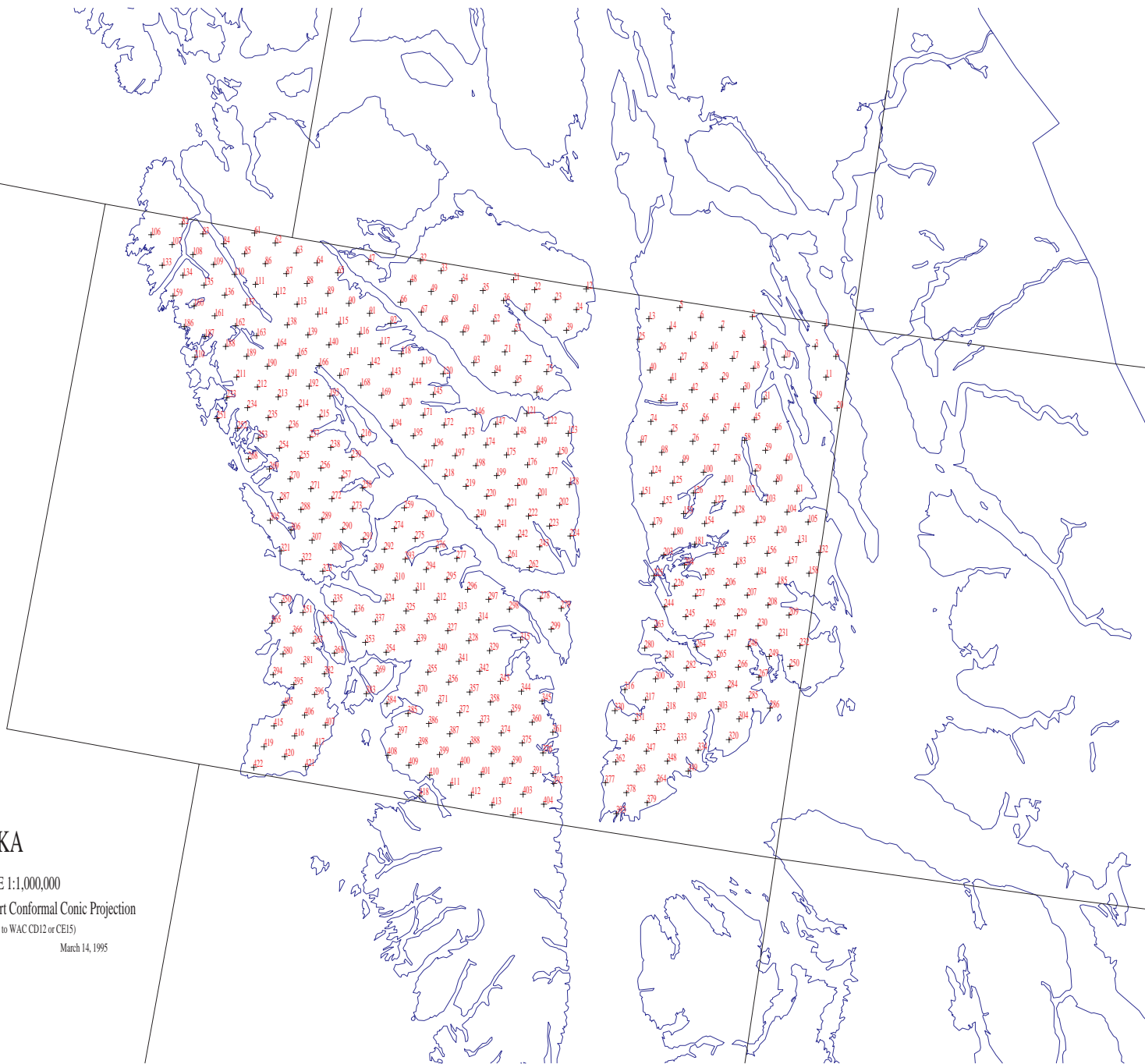
# SITKA

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 14, 1995



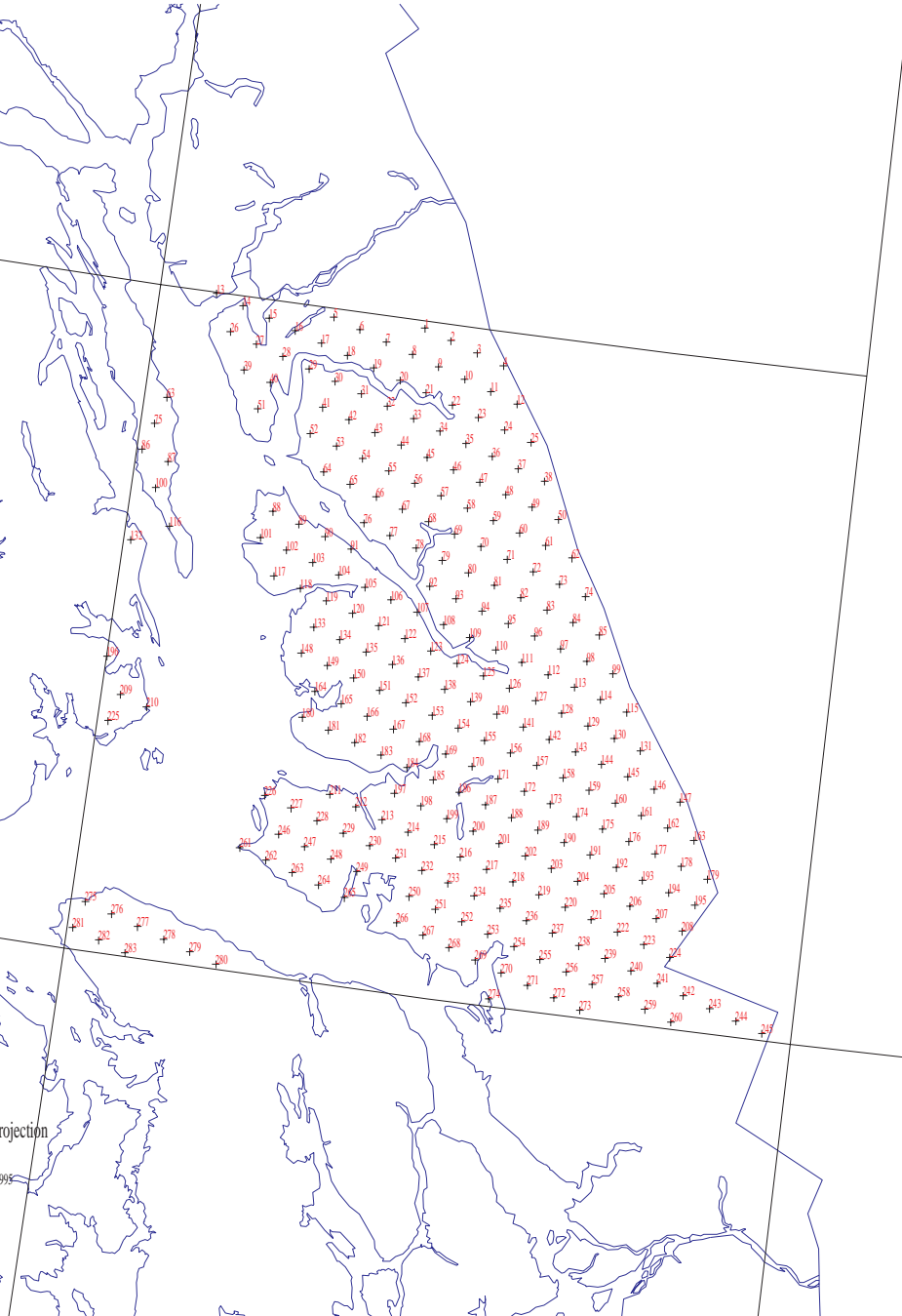
# SUMDUM

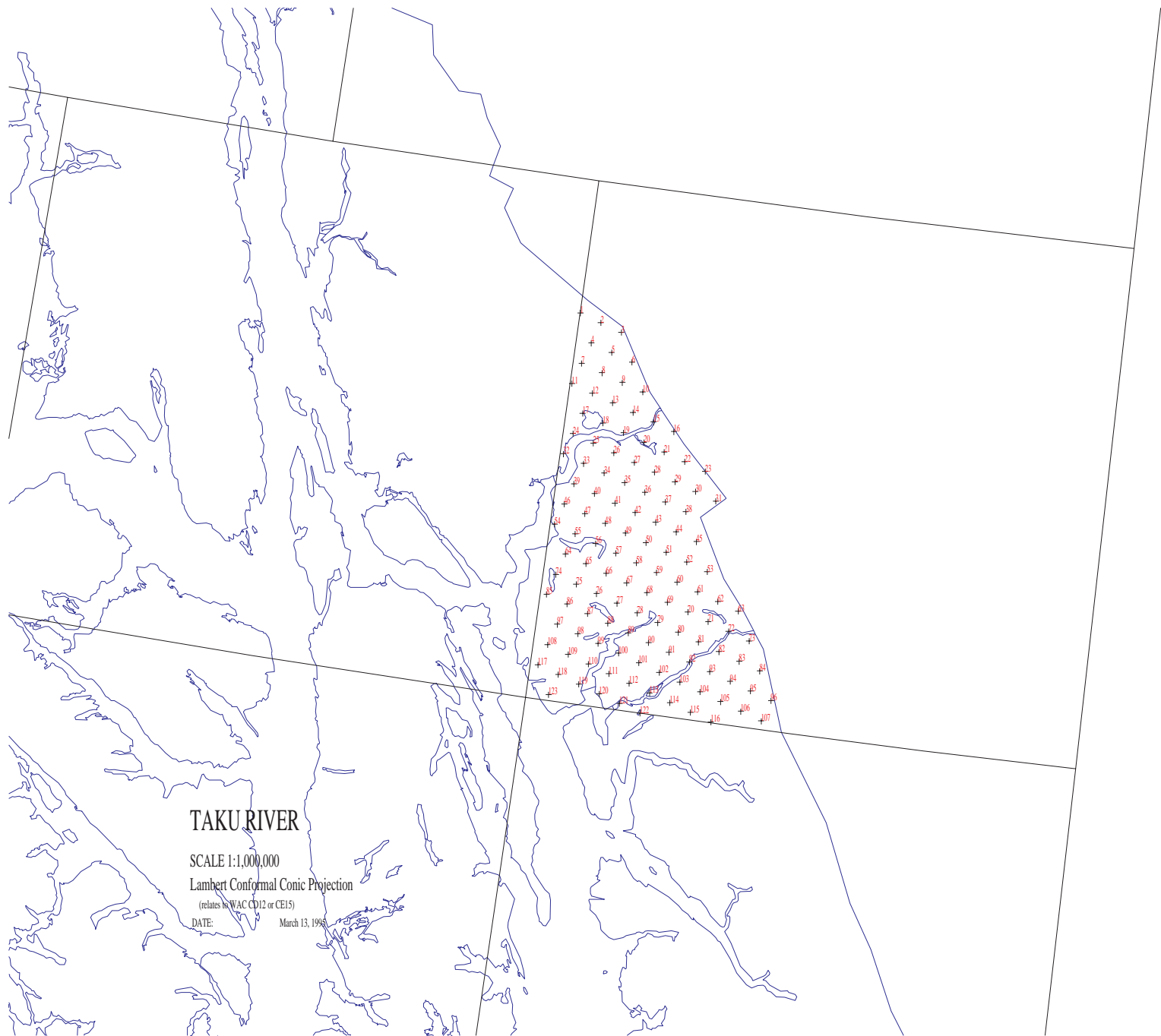
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Lambert Conformal Conic Projection

(relates to WACCD12 or 2E15)

DATE: March 13, 1995





# TAKU RIVER

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WAC CD12 or CE15)

DATE: March 13, 1998

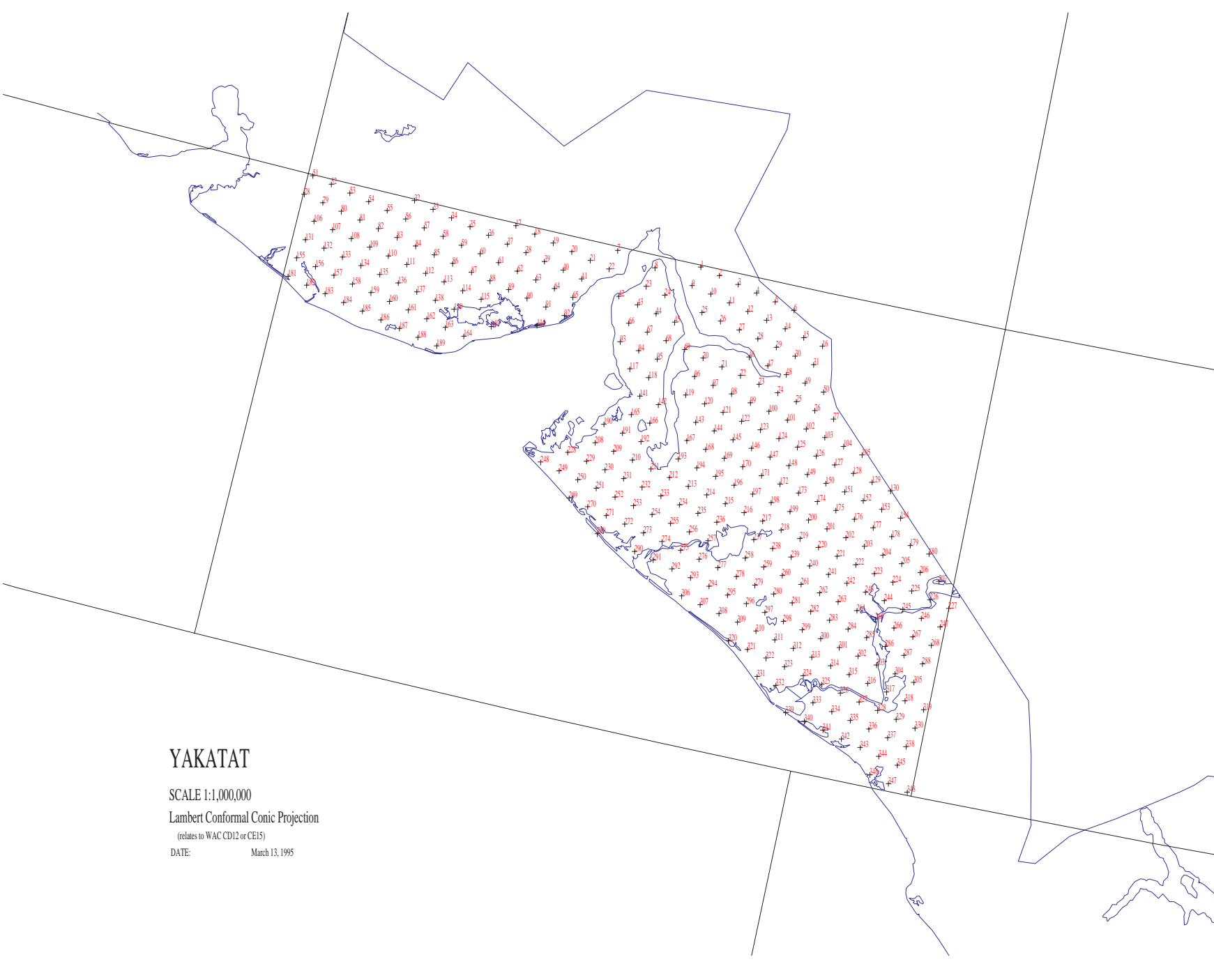
# YAKATAT

SCALE 1:1,000,000

Lambert Conformal Conic Projection

(relates to WACD12 or CE15)

DATE: March 13, 1995



## **APPENDIX - E**

### **Using the PLGR to Document the Sample Location**

#### **Overview**

Plots are located primarily using Ortho Photos or other imagery if needed. Using aerial photos and other imagery may not be 100 percent accurate but is considered the best method available and is assumed to be unbiased. GPS is used to obtain accurate coordinates for each plot, primarily to facilitate relocating the plot in the future.

This inventory will be using the PLGR military receivers to collect coordinates. PLGR stands for *Precision Lightweight GPS Receiver*. These units will provide coordinates that do not have to be differentially corrected in the office. Thus, the coordinates obtained in the field are as accurate as possible.

The following procedures explain where and how each crew will collect and record GPS coordinates. Refer to the Precision Lightweight GPS Receiver (PLGR) instruction manual for detailed information on using the PLGR.

#### **B. Where, and How to collect readings (the quick version)**

GPS coordinates must be collected at the LZ, RP, and IP. Additional coordinates may be collected at points 2-4 or at landmarks as needed. Coordinates should be collected from an “open” location within 5m of the target location. If unable to receive satellite signal within 5m locations further away are legitimate to use but the range-calc option must be utilized (see section K: Range-calc).

1. **Landing Zone (LZ) or Truck** - collect and record coordinates for the LZ or site where the vehicle is parked. These coordinates will provide information to future crews for access and could also help relocate the LZ / vehicle in an emergency.
2. **Reference Point** - collect and record coordinates for the reference point, regardless of how near or far from the initial point (IP). If the LZ/Truck



and RP are the same location be sure to record the coordinates twice on the data sheet and save the waypoint twice with the proper names (see section I: Editing / naming waypoints).

3. **Initial Point** - collect and record coordinates for the initial point (IP).
4. **Other Points** - collect and record coordinates for additional points if IP coordinates are not possible. Be sure to note the point number both on the data sheet and in the waypoint name. Also, use the **Range-calc** function (section K) to calculate coordinates for the initial point (IP).
5. **Landmarks** - collect and record coordinates of landmarks if they are particularly helpful in locating the plot. Landmarks are not required and coordinates should only be collected if they greatly enhance the ability to relocate the plot.

## C. General Instructions for Operating PLGR

**WARNING:** Do not remove the memory battery located in the bottom of PLGR. This will erase the CRYPTO key, which allows the unit to decode the introduced selective availability (SA) errors. If this key is erased the unit will need to be returned to the manufacturer for service and repair.

### Turning the PLGR on / off:

Pushing the **ON/BRT** button turns on the PLGR, which will perform a short self-test and then begin to determine its location in “continuous” mode. To turn PLGR off push the **OFF** button twice.

Note, the PLGR uses considerable battery power thus always doubling checking that the machine is actually off is a wise habit to develop. This will help conserve batteries until they are needed.

### Manipulating the PLGR:

Adjust screen backlight: ON/BRT key plus up/down key for rapid change.

Check display status: use MENU key, STATUS.

LEFT/RIGHT arrow keys move the cursor between fields and identify changeable fields.

UP/DOWN arrow keys make selections, scroll through menu pages when the □ symbol appears in the lower right hand corner, and change the contents of a field when it's blinking.

On-line help: MENU key, HELP option, or press LEFT/RIGHT arrow keys at the same time.

NUM LOCK key toggles the mode of the keypad: control or numeric. In Numeric mode when N is visible in the lower right-hand corner of screen.

Keypad map: press ON/BRT key and MENU key at the same time.

## D. PLGR Setup Options

Listed below are the parameters to be setup before collecting satellite readings.

**IMPORTANT: Items in bold are particularly important.**

Press MENU key, SETUP option to scroll through the following pages:

### Position, Line Heading, Setting

#### SCREEN 1

Setup Mode: **Cont**

SV- Type: **Mixed**

#### SCREEN 2

**L/L –dms**                      **Metric**

Elev: **Meter**                      **MSL** (Mean Sea Level)

ANG: **DEG**                      **Mag**

#### SCREEN 3

Type: **Calc**                      **deg**

#### SCREEN 4

Wage: **ON**

ELHold: **automatic**

TIME: **Z- 900**

ERR: **EHE +/- 2D**

#### SCREEN 5

Setup DTM: **NAS- C**

**NA27CONUS/ CLK66**

Automatic Off

Timer: **20 minutes**

**\*Additional setup screens do not need any changes; default settings are good.\***

## **E. Recording GPS information**

GPS information is recorded on the Location Record.

For each set of coordinates location record the following data:

- GPS unit number: hand written on front of unit
- WP number: assigned by PLGR unit
- WP name: assigned by field crew (see Item I, Appendix D)
- Latitude: degrees / minutes / seconds
- Longitude degrees / minutes / seconds
- Error: (+ / - m)

**Hits: approximate number (“350”, “180+”, “only 25”, etc)**

## **F. Collecting coordinates (quick outline)**

1. Start the GPS in “continuous” mode
2. Wait for error to drop to approximately >20m +/-
3. Switch to “average” mode
4. Collect greater than 180 hits
5. Mark waypoint
6. Edit waypoint name
7. Record GPS data on Location Record

## **G. Positioning**

The Position (**POS**) feature of the PLGR provides coordinates for the present position using Latitude/ Longitude (Lat/ Long) or other grid system. When the PLGR is turned on it automatically displays the Positioning screen after a short self-test and begins to determine its location in Continuous mode.

**Continuous Mode** is used to identify the current position quickly but less accurately.

**Turn PLGR on**, at this point the PLGR will begin acquiring satellites using Continuous mode. An estimate of accuracy is displayed in the upper right hand corner. Wait for accuracy to settle to approximately  $\pm 20\text{m}$ , this may take up to 15 minutes depending of canopy cover, the surrounding landscape and other factors. **Do not move the PLGR while it is acquiring satellites.**

**Average Mode** is used to identify the current position precisely but slowly.

**Switch to average mode** by pushing and holding the **POS** button for approximately 5 seconds until the field in the upper left hand corner reads **AVG**. The PLGR will begin to average the coordinates from each satellite hit, indicated by numbers just to the right of the **AVG** symbol. Allow the PLGR to average at least 180 hits. **Do not move the PLGR while it is in average mode.**

## **H. Marking / Setting Waypoints**

A waypoint is a specific location recorded in the PLGR for future reference. Examples of a potential waypoint may include: location of the truck, trailhead, specific landmark, reference point (RP), or initial point (IP). There are two general methods of setting waypoints in the PLGR 1) using the **Mark** key or 2) manually setting a waypoint using the **WP** Key.

### **Marking a Waypoint**

Use the **MARK** key when you wish to save the coordinates of your current position. After acquiring position coordinates at a given location -- using the Positioning feature described above -- simply push the **MARK** button twice. This action automatically saves the current screen coordinates as the next unused waypoint in the list.

### **Setting a Waypoint**

Use the **WP** key to manually enter known coordinates a new unused waypoint. This is used when it is necessary to navigate to a location that has not been previously marked.

To enter the Waypoint menu:

1. Push the **WP** key.
2. The **ENTER** field should be flashing; use the down arrow key to select the **ENTER** field.
3. The WP### in the upper left hand corner indicates the waypoint number to be saved (note this number for future reference).
4. Scroll to the 1st field on the 2nd line using the right or left arrow key, and enter the desired Northing (latitude) coordinates. Note, all latitude coordinates will be N (north).
  - A. Use the down arrow to highlight the first digit (1st digit should be flashing).
  - B. Depress the down/ up arrow until the desired number appears.
  - C. Use the right arrow to select the next digit.
5. Then highlight the Easting (longitude) field and enter the desired Easting coordinates. Note, all longitude coordinates will be W (west).
6. Entering the elevation information is useful but not necessary.
7. Scroll to the end of the page and exit. The waypoint is stored by pushing the **WP** key.

## I. Editing / Naming a Way Point

Waypoints are named using the plot number followed by LZ, RP, IP, or PT# to identify landing zone, reference point, initial point, or point #. Other landmarks are named using L# after the plot number, a note must be made on the Location record describing the landmark.

Example: Plot ABC1234

Landing zone    ABC1234LZ

Reference point ABC1234RP

Initial point        ABC1234IP

Point 3            ABC1234P3

Landmark 1        ABC1234L1

Note: WP005 (ABC1234L1) is a large avalanche chute  
halfway    between RP and LZ.

1. To rename a waypoint as something other than the PLGR default name, push the **WP** key and select edit.

2. Highlight the **WP** field in the upper left hand corner and scroll to the waypoint number to be renamed.
3. Push the right arrow twice to highlight the field to the right (entire field should be flashing). This field is a 10-character field used to assign the waypoint a Name.
4. Use the down arrow to highlight the first letter (1st character should be flashing). Depress the down/ up arrow until the desired number or letter appears. Use the right arrow to select the next character.
5. Push the **WP** key to save the updated waypoint name.

## **J. Navigating**

Navigation mode is used when trying to find a previously marked location or coordinates that were manually entered into the PLGR. Occasionally, plots without adequate aerial or satellite imagery are located in this manner. There are several modes of operation for navigating; for the purposes of this inventory work, use either the **slow** or **2d Fast** mode.

### **Slow direct mode**

Use slow direct mode for navigation when traveling at a speed below 1 mile per hour, such as through rough or steep country. Also use this mode when traveling under a dense forest canopy where satellite signal penetration is poor.

### **2D Fast direct mode**

Use this mode for quick and direct navigation when the required speed of 1 mile per hour can be maintained. This is the most commonly used mode when traveling in a vehicle such as a truck or slow moving helicopter but not an airplane.

### **Procedure either mode**

1. Push the **NAV** key to enter into the navigation menu.
2. Using the right arrow key, highlight the first field on the first line of the navigation menu and select **Slow** or **2D Fast** using the down arrow.
3. Using the right arrow key, select the 2nd field on line one. Select **Direct** by pushing the down arrow.

4. Using the right arrow key, highlight the **WP** field. Select the waypoint number desired using the down arrow key.
5. Using the right arrow, scroll to the P at the bottom of the page. Use the down arrow key to change the page.

### **Range & Azimuth Slow mode**

Screen 2 will display the Waypoint Number (**WP**), Range (**RNG**), and Azimuth (**AZ**) to waypoint. The Range is the distance to the waypoint in meters. The azimuth is the direction (in degrees) to the selected waypoint. Screen 3 displays additional information that may be helpful in finding the plot but is not critical including: Elevation Difference (**ELD**) between the current location and the waypoint; and the Slant Range (**SR**) or slope distance to the selected waypoint, azimuth (**AZ**) same as previous screen, and Elevation Angle (**ELA**) which is similar to slope. Some of the additional parameters will not be available unless an accurate estimate of elevation is entered in the Waypoint record.

### **Range & Azimuth 2D Fast mode**

Screen 2 will display the Waypoint Number (**WP**), Azimuth (**AZ**), Track (**TRK**) that is heading of vehicle to waypoint, and other information. The Range to the waypoint is shown on screen 3. Also on screen 3 and screen 4 additional information is displayed additional that may be helpful in finding the plot but is not critical to successfully navigating to a set of coordinates. Please consult the official PLGR manual from the manufacturer for further information.

## **K. Range-calc: calculating coordinates of the IP from a nearby location**

Use this function to calculate GPS coordinates for the initial point when you cannot obtain a fix at the IP – due to heavy tree cover or steep topography where satellite reception is poor -- but where you can get a fix at the RP or at a nearby opening. Only use this option after attempting to get a satellite fix at the IP.



To calculate the coordinates of the IP:

1. Attempt to obtain a fix in an open area near the IP (within a few hundred feet). If this is not possible, use a pre- marked Waypoint (such as the RP).
2. Use the WP key to enter the Waypoint Menu and then select the Range- Calc option.
3. From the Range- Calc menu, select the Waypoint you wish to use;
4. In the appropriate fields enter the distance, azimuth, and elevation angle (**slope: measured in degrees**) change from the Waypoint to the IP. The distance, azimuth, and elevation angle (slope) must first be determined on the ground by the field crew. To enter the elevation angle highlight the Elevation (EL) field and change it to Elevation Angle (ELA).
5. Scroll to the Page icon, and use the down arrow to go to the Range- Calc Position page. The Range- Calc Position Page displays the calculated coordinates of the new waypoint (note: the elevation listed is for the waypoint, not necessarily the IP). The next page contains the store Waypoint Menu, which stores the IP waypoint as the last waypoint in the list. Save the IP waypoint and edit the waypoint name.

## **Appendix – F**

### **Slope correction and conversion tables**

#### **CONVERSIONS SPECIFIC TO THIS MANUAL**

5 inch diameter	= 12.5 centimeter
4.5 feet (breast height)	= 1.37 meters
18.5 foot radius H/V plot	= 5.64 meter radius
120 foot stringer width	= 35 meters
1 acre	= 0.4 hectares
1/8 mile	= 200 meters
40 acre noncensus water	= 16 hectares

#### **ENGLISH CONVERSIONS**

inch = 2.54 centimeters  
feet = 0.305 meters  
acre = 0.405 hectares  
sq. feet = 0.093 sq. meters

#### **METRIC CONVERSIONS**

centimeter = 0.394 inch  
meter = 3.278 feet  
hectare = 2.47 acres  
sq. meters = 10.37 sq. feet

#### **STANDARDS SUBSTITUTED IN THIS MANUAL – NOT CONVERSIONS**

6.56 foot radius seed/sap plot  $\nless 2$  meter radius  
nearest 1/10th inch diameter  $\nless$  nearest millimeter  
2 inch diameter class  $\nless$  5 centimeter diameter class  
tree height to nearest foot  $\nless$  tree ht. to nearest decimeter  
crown radius in feet  $\nless$  crown radius in decimeters  
12 foot log  $\nless$  4 meter log  
16 foot log  $\nless$  5 meter log  
9 inch DBH softwood pole/saw break  $\nless$  22.5 centimeter break  
11 inch DBH hardwood pole/saw break  $\nless$  27.5 centimeter break  
4 foot tree volume section  $\nless$  1.25 meter section

## SLOPE CORRECTION: SLOPE DISTANCE TO HORIZONTAL DISTANCE

- 1) Measure the slope percent with the clinometer from eye level to an object at eye level along the slope.
- 2) Measure the horizontal distance or slope distance with a tape.
- 3) Look up the correction factor in the slope correction table.
- 4) Multiply the measured distance by the horizontal or slope correction factor to get the actual horizontal or slope distance.

### SLOPE CORRECTION FACTORS

Percent t	Slope Dist. (Horiz. Dist. X Factor)	Horiz. Dist. (Slope Dist. X Factor)	Slope Dist. for 5.64 m	Slope Dist. for 7.30 m	Slope Dist. for 30 m
10	1.005	.995	5.67	7.34	30.15
15	1.010	.99	5.70	7.37	30.30
20	1.020	.98	5.75	7.45	30.60
25	1.031	.97	5.81	7.53	30.93
30	1.044	.96	5.89	7.62	31.32
35	1.060	.94	5.98	7.74	31.80
40	1.077	.93	6.07	7.86	32.31
45	1.097	.91	6.19	8.01	32.91
50	1.118	.89	6.30	8.16	33.54
55	1.141	.88	6.43	8.33	34.23
60	1.166	.86	6.58	8.51	34.98
65	1.194	.84	6.73	8.72	35.82
70	1.221	.82	6.89	8.91	36.63
75	1.250	.80	7.05	9.13	37.50
80	1.281	.78	7.22	9.35	38.43
85	1.312	.76	7.40	9.58	39.36
90	1.345	.74	7.59	9.82	40.35
95	1.379	.72	7.78	10.07	41.37
100	1.414	.70	7.97	10.32	42.42
105	1.450	.69	8.18	10.59	43.50
110	1.486	.67	8.38	10.85	44.58
115	1.524	.66	8.59	11.13	45.72
120	1.562	.64	8.81	11.40	46.86
125	1.601	.62	9.03	11.69	48.03
130	1.640	.61	9.25	11.97	49.20
135	1.680	.60	9.47	12.26	50.40
140	1.720	.58	9.70	12.56	51.60
145	1.761	.57	9.93	12.86	52.83
150	1.803	.55	10.17	13.16	54.09

## **HORIZONTAL DISTANCES CORRECTED FOR SLOPE**

---

% Slope		Slope distance in meters					
0	10	20	25	30	40	50	
10	10.05	20.10	25.12	30.15	40.20	50.25	
20	10.20	20.40	25.50	30.59	40.79	50.99	
30	10.44	20.88	26.10	31.32	41.76	52.20	
40	10.77	21.54	26.93	32.31	43.08	58.85	
50	11.18	22.36	27.95	33.54	44.72	55.90	
60	11.66	23.32	29.15	34.99	46.65	58.31	
70	12.21	24.41	30.52	36.62	48.83	61.03	
80	12.81	25.61	32.02	38.42	51.22	65.03	
90	13.45	26.91	33.63	40.36	53.81	67.27	
100	14.14	28.28	35.35	42.43	56.57	70.71	

## **Appendix – F**

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2 inch diameter class  $\nless$  5 centimeter diameter class  
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crown radius in feet  $\nless$  crown radius in decimeters  
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16 foot log  $\nless$  5 meter log  
9 inch DBH softwood pole/saw break  $\nless$  22.5 centimeter break  
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4 foot tree volume section  $\nless$  1.25 meter section

## SLOPE CORRECTION: SLOPE DISTANCE TO HORIZONTAL DISTANCE

- 1) Measure the slope percent with the clinometer from eye level to an object at eye level along the slope.
- 2) Measure the horizontal distance or slope distance with a tape.
- 3) Look up the correction factor in the slope correction table.
- 4) Multiply the measured distance by the horizontal or slope correction factor to get the actual horizontal or slope distance.

### SLOPE CORRECTION FACTORS

Percent t	Slope Dist. (Horiz. Dist. X Factor)	Horiz. Dist. (Slope Dist. X Factor)	Slope Dist. for 5.64 m	Slope Dist. for 7.30 m	Slope Dist. for 30 m
10	1.005	.995	5.67	7.34	30.15
15	1.010	.99	5.70	7.37	30.30
20	1.020	.98	5.75	7.45	30.60
25	1.031	.97	5.81	7.53	30.93
30	1.044	.96	5.89	7.62	31.32
35	1.060	.94	5.98	7.74	31.80
40	1.077	.93	6.07	7.86	32.31
45	1.097	.91	6.19	8.01	32.91
50	1.118	.89	6.30	8.16	33.54
55	1.141	.88	6.43	8.33	34.23
60	1.166	.86	6.58	8.51	34.98
65	1.194	.84	6.73	8.72	35.82
70	1.221	.82	6.89	8.91	36.63
75	1.250	.80	7.05	9.13	37.50
80	1.281	.78	7.22	9.35	38.43
85	1.312	.76	7.40	9.58	39.36
90	1.345	.74	7.59	9.82	40.35
95	1.379	.72	7.78	10.07	41.37
100	1.414	.70	7.97	10.32	42.42
105	1.450	.69	8.18	10.59	43.50
110	1.486	.67	8.38	10.85	44.58
115	1.524	.66	8.59	11.13	45.72
120	1.562	.64	8.81	11.40	46.86
125	1.601	.62	9.03	11.69	48.03
130	1.640	.61	9.25	11.97	49.20
135	1.680	.60	9.47	12.26	50.40
140	1.720	.58	9.70	12.56	51.60
145	1.761	.57	9.93	12.86	52.83
150	1.803	.55	10.17	13.16	54.09

## **HORIZONTAL DISTANCES CORRECTED FOR SLOPE**

---

% Slope		Slope distance in meters					
0	10	20	25	30	40	50	
10	10.05	20.10	25.12	30.15	40.20	50.25	
20	10.20	20.40	25.50	30.59	40.79	50.99	
30	10.44	20.88	26.10	31.32	41.76	52.20	
40	10.77	21.54	26.93	32.31	43.08	58.85	
50	11.18	22.36	27.95	33.54	44.72	55.90	
60	11.66	23.32	29.15	34.99	46.65	58.31	
70	12.21	24.41	30.52	36.62	48.83	61.03	
80	12.81	25.61	32.02	38.42	51.22	65.03	
90	13.45	26.91	33.63	40.36	53.81	67.27	
100	14.14	28.28	35.35	42.43	56.57	70.71	

## Appendix - G

### RADIO FREQUENCIES

7 May 1996

#### **Channel Group 1 Chugach**

CH	RX FREQ	TX FREQ	TX CG
1	169.1750	169.1750	
2	169.1750	169.9750	110.9
3	169.1750	169.9750	123.0
4	169.1750	169.9750	131.8
5	169.1750	169.9750	136.5
6	169.1750	169.9750	146.2
7	169.1750	169.9750	156.7
8	169.1250	169.1250	
9	162.5500	0.0	
10	156.8000	156.8000	

#### **Channel Group 2 Chatham "A" / Group 1 Frequencies"**

CH	RX FREQ	TX FREQ	TX CG	LOCATION
1	164.1250	164.1250	123.0	relay
2	168.6750	171.4750	100.0	temp repeater Sitka
3	169.1000	169.1000	123.0	N. Kruzof - J-Sitka Area simplex
4	168.7250	168.7250	123.0	Mud Bay - H-Sitka Area simplex
5	168.7250	171.5750	123.0	Neka Mt - H-repeater
6	168.7250	171.5750	114.8	Seal Mt - H-repeater
7	168.7250	171.5750	136.5	Steelhead Mt - H-repeater
8	168.6750	168.6750	123.0	Biorka Is - S-simplex
9	168.6750	171.4750	123.0	Moore Mt - S-repeater
10	168.6750	171.4750	114.8	Mt Furuhelm - S-repeater
11	170.1250	170.1250	123.0	crew net/relay-simplex
12	168.7250	171.5750	100.0	OPEN/temp repeater-Hoonah
13	169.1000	170.1500	100.0	OPEN/temp repeater-Juneau
14	162.5500	0.0		weather

#### **Channel Group 3 Juneau/Yakutat/Petersburg Net**

CH	RX FREQ	TX FREQ	TX CG	LOCATION
1	164.1250	164.1250	123.0	relay
2	169.1000	170.1500	114.8	Windfall - J-repeater
3	169.1000	169.1000	123.0	Auke Mt - J-simplex
4	169.1000	170.1500	103.5	AKWE - Yakutat-repeater
5	169.1000	170.1500	123.0	William Henry - J-repeater
6	169.1000	170.1500	82.5	Mtn Lake - Yakutat-repeater
7	169.1000	170.1500	77.0	Taku - J-repeater
8	169.1000	170.1500	71.9	Beezer - J-repeater
9	156.8000	156.8000		Marine CH 16-Emergency Only

## **APPENDIX G - 1**



10	157.1000	157.1000		Coast Guard CH 22- <b>Emergency Only</b>
11	170.1250	170.1250	123.0	crew net/relay-simplex
12	169.1750	169.1750	123.0	"PSG #1, Lindenberg (direct)-simplex"
13	169.1750	169.9000	136.5	"PSG #6, Farragut-repeater"
14	169.1750	169.9000	110.9	"PSG #4, Kuiu-repeater"

#### **Channel Group 4      Stikine Area Radio Frequencies**

CH	RX FREQ	TX FREQ	TX CG	LOCATION
1	169.1750	169.1750	123.0	Lindenberg
2	169.8750	169.8750		
3	169.1750	169.9000	103.5	Etolin repeater
4	169.1750	169.9000	110.9	Kuiu repeater
5	169.1750	169.9000	131.8	Fools repeater
6	169.1750	169.9000	136.5	Farragut repeater
7	169.1750	169.9000	146.2	Elbow repeater
8	169.1750	169.9000	156.7	portable/Tyee
9	169.1250	169.9750		Red Bay-Ketchikan
10	169.1500	168.1500	123.0	Bernett-Ketchikan
11	168.6750	171.4750	114.8	Furhelm-Chatham
12	172.2500	168.6500		Stikine - ground to air
13	162.4000	0.0		weather
14	156.8000	156.8000		<b>Distress calls</b>

#### **Channel Group 5      Stikine Area Flight Following Frequencies**

CH	RX FREQ	TX FREQ	TX CG	LOCATION
1	168.6500	172.2500	110.9	Lindenberg
2	168.6500	172.2500	131.8	Kuiu
3	168.6500	172.2500	167.9	Fools

#### **Channel Group 6      Prince Of Wales Administrative Radio System**

CH	RX FREQ	TX FREQ	TX CG	REPEATER	COVERAGE	COLOR
1	169.1250	169.1250		High Mtn	local KTN & local simplex	Blue
2	169.1250	169.8750		12-Mile	South POW	Black
3	169.1250	169.9250		Twin Pks	Central POW	Yellow
4	169.1250	169.9750		Red Bay	North POW	Red
5	169.1250	168.1750	151.4	Polk	Polk Inlet	White

#### **Channel Group 7      Revilla Administrative Unit**

CH	RX FREQ	TX FREQ	TX CG	REPEATER	COVERAGE	COLOR
1	169.1500	169.1500		Black Mtn	local Ketchikan & simplex	Green
2	169.1500	168.1500	114.8	Orchard	North Revilla	Brown
3	169.1500	168.1500	123.0	Burnette	Cleveland Peninsula	Orange
4	169.1500	168.1500	136.5	Boca	Quartz Hill	Violet
5	169.1500	168.1500	151.4	Punchbowl	East Behm Canal	Gray
6	169.1500	168.1500	167.9	High Mtn	local Ketchikan RD	Gold
7	169.1500	168.1500	186.2	Neets Bay	Neets Bay	Port

## **Appendix – H**

### **TREE CORE EXTRACTION, HANDLING, AND STORAGE PROTOCOLS**

#### **Introduction**

Recorded in the pattern of tree growth rings is a vast amount of information on a number of ecological factors such as regional climatic variations and forest disturbance history. Of particular importance is the need to learn how natural disturbance factors like wind, fire, insects, and diseases have shaped forest structure and composition. Understanding these effects provides an objective method for evaluating the effects of timber harvest on the function of Coastal Alaska forest ecosystems.

The opportunity afforded us through the forest inventory grid work is unique and exciting for several reasons. First, through tree ring analysis, the inventory sampling system will allow us to get a limited look at disturbance regimes across the entire coastal region. Secondly, the tree ring data will be associated with on-the-ground inventory assessments of stand structure and composition characteristics. Finally, the data will be closely tied to geographic locations through georeferencing. The result may be a region-wide picture of climatic and natural disturbance patterns that is unprecedented.

#### **EQUIPMENT AND PROCEDURES:**

Borers and bits: Haglof and Suunto increment borers will be used. The borers have 16 inch, two or three-thread bits with .169 inch core diameters. Bits are expensive and must be maintained to maximize longevity and core quality.

Bee's wax helps reduce friction between the bit and the tree. Apply it immediately after removing the bit from the tree while the bit is still warm (hot!). At the end of each days use, the increment borers should be cleaned and the interior should be sprayed with WD-40.

**The most important single factor in prolonging bit life and maintaining a quality surface on the extracted core is to take care of the bit tip.** The steel of the bit is high-quality, high-carbon steel and it chips easily. When coring is completed, place the bit in the handle carefully: hold the handle horizontally and slowly slide the bit in; don't drop it down into the handle because this will eventually result in a chipped cutting edge. Re-sharpening, even if done by the manufacturer, never results in a "like-new" edge.

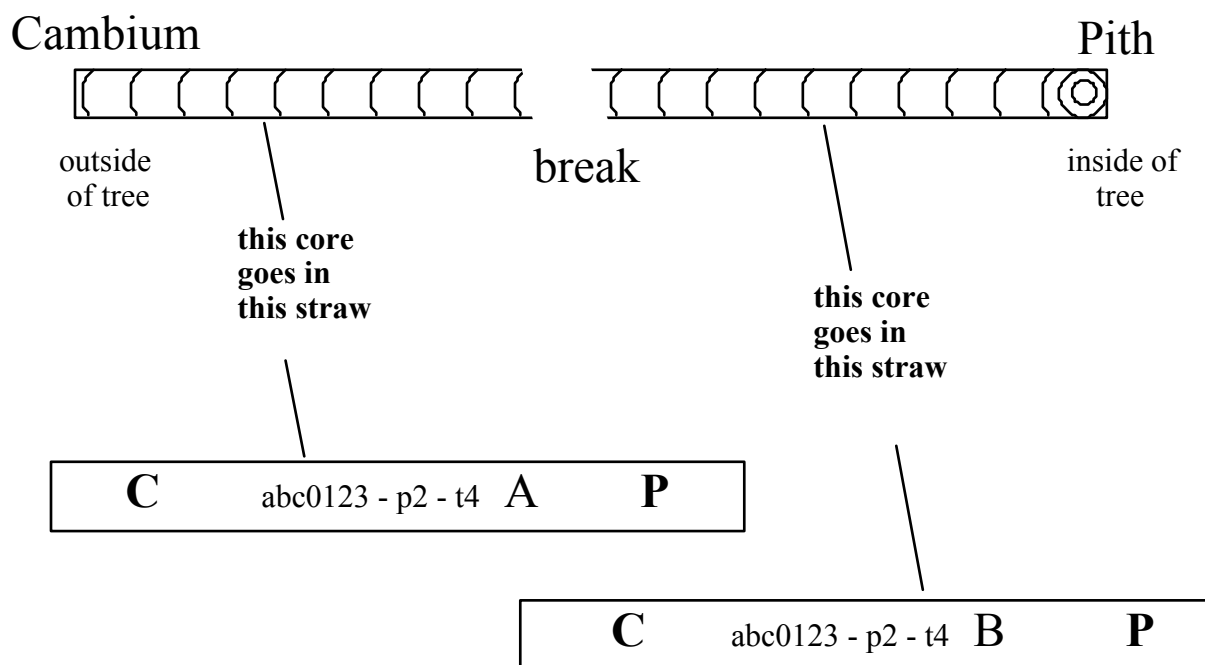
**Extractors:** A properly used extractor can remain serviceable for a couple seasons while the "life expectancy" of one in the hands of a novice can be reduced to a matter of hours.

Extractor tips.

- 1) An extractor often won't slip in under a core on the first try. You may need to attempt to insert the extractor at several points around the circumference of the core before it will slide all the way in.
- 2) Don't push from the back of the extractor; it bends/breaks easily and more than one person has skewered his/her hand on an extractor! Push the extractor in with your fingers from a point on the extractor close to the increment bore handle.
- 3) When you attempt to pull the extractor out and it wont budge, unhook the handle latch from the bit and give a short, controlled pull straight back (to avoid bending).

**Core collection and storage:** Cores will be collected from both age and site trees (see TREE RECORD, FIELD 5-22 Site/Age Tree for documentation). If cores are to be kept, paper or plastic straws will be used for storage. With paper straws, cores can be kept intact by sliding them into multiple straws and carefully connecting the straws by crimping one straw and sliding the end of the other straw over the crimped end. With plastic straws, cores can be kept intact by sliding them into multiple straws and carefully melting/crimping the ends shut and carefully stowing them into your tatum or other rigid storing place. In some cases, cores will need to be carefully broken to fit in the straws. The orientation of the core, as “loaded” into the straw, should be recorded on the straw as described in below.

Plot ABC0123, Point 2, Tree 4  
core example



**Straw Labeling:** Straws will be labeled with location number, point number, and tree number. If two straws must be used to hold an entire core, the straw holding the core piece closest to the cambium will be labeled A and the core piece closest to pith will be labeled B. Each straw will have its ends labeled C and P to correspond with the cores orientation with end closest to the cambium marked C and end closest to the pith marked P. It is a simple but important task to properly and clearly label cores. Without a label, a core is useless. Pilot SCUF pens seem to work best for labeling straws as the pen has a fine point and is indelible. The only drawback is that the surface being written on must be dry. Store straws in a plastic bag or your tatum.

**Post-Field Storage:** The main aspect of handling and storage of cores is that the cores not be roughly handled to the point where they are broken further or separated from their labeling. It's best if cores are transferred daily to the large PVC pipe storage tubes. Cores will periodically be returned to the office.

**Processing:** Cores will be mounted, sanded and polished, the rings will be digitized, and the data analysis begun.

# **Appendix I**

## **Northern Goshawk Survey**

### **Protocol**

Surveys for Northern Goshawks will be completed for every plot regardless of forest or vegetative including plots dominated by bare rock, ice, or water. Additionally, any incidental encounters will be recorded. Complete a Goshawk Survey Form for each positive response. Survey forms are not needed for negative responses.

**Type of Vocalization to Use:** You have a choice between two different vocalizations to call goshawks. The effectiveness of each varies with the season. The “Alarm” is most effective during courtship and early nesting periods (March-June) when adults are territorial. The “Wail” call is most effective later in the breeding season during late nesting and fledgling stages (July - August) when the juveniles are very vocal and responsive to calls.

**Volume:** Broadcasts should be loud but not distorted. The quality of the sound is more important than excess volume.

**Direction of Broadcasts:** The calls should be broadcast at - 120 degree angles around a point to give a full 360 degrees of broadcast coverage.

**Duration of the Broadcasts:** Broadcast for 10 seconds then observe for 30 seconds. Repeat this for each 120-degree angle. When a complete circle has been done repeat the broadcasts again so that each 120 degree angle will have been broadcast at twice.

**Observation Period:** Remain alert, quiet and observant for 30 seconds after each broadcast and for 3 minutes after the full sequence.

### **Goshawk Survey Form Data Fields**

**Observer's Name:** Fill in the name of the crew person who is responsible for conducting the broadcast at the present location.

**Time:** Record the time of day the broadcast was conducted or a sighting occurred. Use 24-hour clock time (example: 3:15 in the afternoon would be 15:15).

**Date:** Record the date the broadcast was conducted at the location. Record as follows: MM/DD/YY.

**GPS Coordinates:** Enter the coordinates for the site where the broadcast was conducted. If the broadcast is being conducted close to the actual location use the coordinates found on the location folder. If the broadcast is conducted far away from the location (>400 meters) GPS coordinates should be obtained at the point of measurement. Record degrees minutes and seconds for the latitude and longitude.

**Elevation:** Record the elevation to the nearest 100 feet for the area where the broadcast was performed.

**General Location (Physical Location):** Record a description for the general area where the broadcast was performed. Example: Baranof Is., NW side of Warm Springs Bay.

**Habitat Type:** Record the prominent habitat type for the area of the broadcast. Examples: valley bottom old growth spruce/hemlock forest; Mixed conifer (y. cedar, mtn hemlock, w. hemlock, pine).

**Weather:** Record the general weather at the time of the broadcast. Example: overcast with light drizzle.

**Location of Broadcasts:** Check the line applicable to where the broadcasts were made.

Available options:

- Designated Veg. Plot (location being sampled; record loc #)

- Helicopter LZ (if broadcast at or close to the LZ)
- Other (i.e. ridgetop; make a note describing the area)
- Incidental Observation (any observation not near the sample location)

**Response Detected:** Record if there was a response from a goshawk to the broadcast. Available options: Yes or No

**The Following Variables are only collected if you get a response to the goshawk broadcast.**

**Response time:** Record the amount of time from when the broadcasts were made to when a goshawk responded. Record in minutes and seconds.

**Response Type:** Record the type of response that was observed.

- Vocal only (no goshawk was actually sighted)
- Flew in to perch and vocalize
- Flew by observer (did not land)
- Jay's mimicking calls (Steller's Jay or possible yellowlegs)
- Incidental observation (not a response to broadcast calls)

**Compass Bearing & Distance:** Record the magnetic azimuth and distance in meters from the broadcast site to the following applicable observations.

- Az/Dist. to bird calling
- Az/Dist. to bird in flight
- Az/Dist. to perched bird

**Comments:** Record a description of the response that was observed and any comments that would help personnel who might return to the sight.



## **Appendix – J**

### **NRCS Earth Cover Survey**

The Natural Resource Conservation Service (NRCS) is in charge of collecting data for a broad based multi-resource inventory called the Natural Resource Inventory (NRI). The inventory is mandated by Congress to be conducted every 5 years to determine the status, condition, and trends of the nation's water and related resources.

Most of the information that is being collected on the Coastal Alaska GRID Inventory meets or exceeds the needs of the NRI. The few variables not covered by the GRID inventory can be obtained using the information within the NRCS survey form.

There are three variables that must be collected at each location (land cover, land/water use, and distance to habitat). The information recorded for each of the variables should be relative to the Initial Point (point 1) of the sample location.

#### **NRCS Survey Form – Instructions**

Record the following information on the NRCS form:

Recorder Initials: Record the initials of the person who is responsible for filling out the NRCS form.

Location ID: Record the 7 character alpha-numeric code for the location being measured.

Land Cover Code: Record the 3-digit land cover code using the codes provided on the survey form. Land cover is the vegetation or other kind of material that covers the land surface. Some of the listed covers imply a land use also (i.e., cropland is a use with an associated cover). Don't get confused by this. The categories should still be treated as cover. You will collect land use information next

Primary Land/Water Use: Record the 2-digit code that represents the primary use for the cover listed above. Use the codes provided on the survey form.

Secondary Land/Water Use: Record the 2-digit code that represents the secondary use for the cover listed above. Use the codes provided on the survey form. Record 0 if there is no secondary use.

Distance to Habitat: Estimate and record the distance (in meters) from the initial point to the nearest occurrence of each of the habitat types listed on the survey form. Record 0 if the point falls in the habitat type; record 999 if the nearest occurrence is **greater than 433 meters (1/4 mile)**.

Before leaving the location make sure the NRCS form is complete and correct. Place completed NRCS forms in plot folder for the location sampled.

## Appendix – K

### CHECK LIST OF EQUIPMENT NEEDED FOR 1 CREW

#### GENERAL

Laser.....1  
 PLGR/GPS .....1  
 FM Radio/X Batt.....1  
 Husky Computer.....1  
 Rifle/Ammo.....1  
 Folding Saw .....1  
 Survival Kit .....1  
Location Folder:  
   a)Photo set .....1  
   b)Loc. Record .....1  
   c)H-V Form .....4  
   d)Tr/DW/Soil/Pt/Poly/  
     NRCS..... 1 ea.  
 Stereoscope .....1  
 Photo Protractor .....1  
 Location Tags .....7  
 Plot Pins .....7  
 Flagging Roll .....1  
 First-Aid Kit .....1  
 Calculator .....1  
 Camera, Film, Banner .....1  
 AA Batteries .....5  
 Shovel .....1

#### TIMBER

Compass .....2  
 Clinometer .....2  
 D-Tape.....2  
 Field Manual .....1  
 Metric 30 m Tape.....1  
 Logger's Tape.....1  
 Increment Borer.....1  
 Hand Ax .....1  
 Nails.....50  
 Nail Pouch.....1  
 Tatum .....1  
 Tatum Aid.....1  
 Photo Pin Prick .....1  
 Scuff Pen .....1  
 Pencils.....2  
 Cruiser Vest.....1  
 Pack .....1  
 Incr. Core Straws.....15

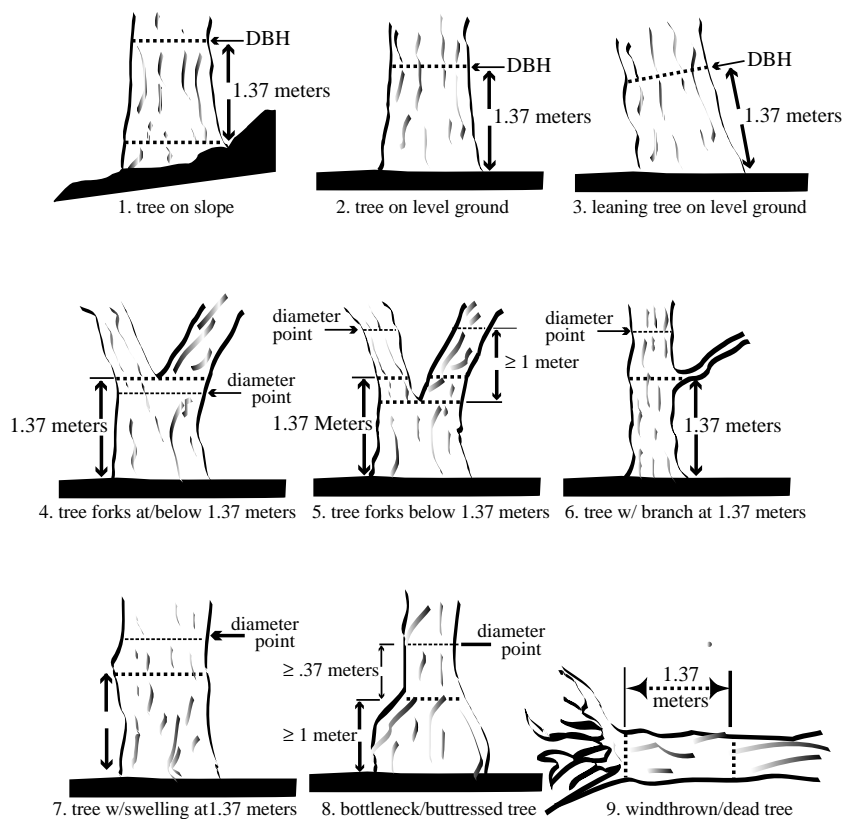
#### VEG

Field Manual .....1  
 Scuff Pen.....1  
 Pencil.....2  
 Logger's Tape .....1  
 Tatum.....1  
 Tatum Aid .....1  
 Pack.....1  
 Photo Pinprick .....1

## Appendix – L

### Standard methods for measuring Diameter at breast height (DBH)

In the simplest case, DBH is tree diameter to the nearest millimeter at 1.37 meters above ground level (breast height).



The following are examples of some of the standards for measuring diameter on nonstandard trees. Every variation cannot be covered. In difficult cases *use common sense* and make sure the DBH location is documented in the Notes.

*Irregularities at breast height:* If the tree has an irregularity in the bole at breast height, diameter must be measured immediately above the irregularity at a point where stem form is no longer affected. Record the height of the diameter measurement in the Notes field of the Tree Record (see Section 5).

*Leaning trees:* distance and DBH will be measured at a point 1.37 m. above the root collar **along the top of the bole**.

*Down trees:* DBH will be measured 1.37 m. from the root collar and distance at a point where the tree would have been measured if standing.

*Trees with missing portions at breast height:* record "reconstructed" DBH. Make a note of this reconstruction in the Notes field of the Tree Record.

*Forked trees:* If the tree forks at or above 1.37 m. (open crotch of the fork at or above 1.37 m.), consider the tree as one tree and measure DBH below the swell as near 1.37 m. as possible. If the tree forks below 1.37 m., consider it two trees. Measure the diameters as near 1 meter above the fork as possible. Record the height of diameter measurement in the Notes field of the Tree Record.